THE ENGINEERING AND MINING JOURNAL

Entered at the Post-Office of New York, N. Y., as Second-Class Matter.

VOL. XXXV. No. 23.

RICHARD P. ROTHWELL, C.E., M.E.,
ROSSITER W. RAYMOND, Ph.D.,
CHARLES KIRCHHOFF, Jr. M.E., } Editors.

NOTE.—Communications relative to the editorial management should be addressed to EDITOR, P.O. Box 1833, New York.

Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND P.O. Box 1465, New York Articles written by Mr. RAYMOND will be signed thus * ; and only for articles so signed is he responsible.

SUBSCRIPTION PRICE, including postage, for the United States and Canada, $4 per annum ; $2.25 for six months ; all other countries, including postage, $5.00 = 20s. = 25 francs = 20 marks. All payments must be made in advance. Parties accepting any other than our official receipt for subscriptions, from agents, do so at their own risk.

FILE COVERS will be sent by mail for $1.25 or delivered at office for $1 each.

Advertising Rates.—See page vii.

Mr. C. A. Green is our accredited representative for New York.

Mr. A. R. Brown, Jr., is our accredited representative for Boston and the Eastern States. Office, Room 1, Simmons Building, 40 Water street, Boston.

Mr. J. Viennot, 150 South Fourth street, Philadelphia, is our accredited representative for Philadelphia.

Mr. A. H. Taylor, 159 Lake street, Chicago, is our accredited representative for Chicago and the Northwest.

Mr. O. D. Cotton, Room 36, Wiggins Block, Cincinnati, O., is our accredited representative for Cincinnati, O., Louisville, Ky., and vicinity.

Mr. O. J. Frost, care Boston & Colorado Smelting Company, Argo, Colo., is our accredited representative for Denver and vicinity.

REMITTANCES should always be made by Post-Office Orders or Bank Drafts on New York, made payable to THE SCIENTIFIC PUBLISHING COMPANY.

THE SCIENTIFIC PUBLISHING CO., Publishers.

R. P. ROTHWELL, Pres. HENRY M. GEER, Sec. and General Manager.

P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

EDITORIALS :	PAGE.
"Paper Transactions" in Oil, Cotton, and Wheat	327
The Roanoke Meeting	327
Water-Gas in England	327
The "Drift" Mines and the "Shaft" Mines of the Coke Men	327
Progress of the Basic Process in Europe	327
Production of the Precious Metals in the United States	327
The Position of Iron	327
Gas for Fuel	328
The Roanoke Meeting of the American Institute of Mining Engineers	228
The Railroad Exhibition at Chicago	329
A Comparison of the Working of a Blast-Furnace with Blast Varying in Temperature from 990° Fahr. to 1414° Fahr	329
Utilization of By-Products in the Manufacture of Coke.—III	331
Ore-Deposits of Summit District, Rio Grande County, Colo	332
The Work of the Pernot Furnaces at Cambria	334
The Iron Ores of the Valley of Virginia	334
The Spelter Production of Europe	336
The Lead Production of Germany in 1882	336
Furnace, Mill, and Factory	336

NOTES :	PAGE.
A Turning from a Cast-Steel Roll	330
Analysis of Steel Made in the Henderson Furnace	335
A New Note-Book	336
Experiments Made with the Lime Process	336
Silver Production of Bolivia	336
Electrolytic Experiments	336
GENERAL MINING NEWS :	
Arizona	236
California	337
Canada	337
Colorado	337
Dakota	337
Idaho	338
Mexico	338
Michigan	338
Montana	338
Nevada	338
New Mexico	338
Utah	338
Wyoming	338
FINANCIAL :	
Gold and Silver Stocks	339
Copper Stocks	339
BULLION MARKET	340
METALS	340
IRON MARKET REVIEW	340
COAL TRADE REVIEW	342
Advertisers' Index	xii

THE enormous speculative dealings in wheat, cotton, and petroleum are attracting considerable attention and unfavorable comment. These paper transactions have assumed a volume that is absurd. The selling and buying, nominally, of nearly 350 million barrels of oil, 3 million bales of cotton, and 175 million bushels of wheat forcibly demonstrates the extent to which the gambling mania has taken hold of the public.

THE first installment of our report of the Roanoke Meeting appears in another column, a large part of it being the publication in full of President HUNT'S inaugural address, an able effort, which will be found to present a vigorous discussion of the means which engineers possess to meet the exigencies of the present period of depression. Some of Mr. HUNT'S suggestions will commend themselves to the consideration of manufacturers, notably his remarks on the labor problem, which is now so profoundly agitating the minds of all.

IN the course of a rambling paper, by Mr. W. S. SUTHERLAND, read before the Iron and Steel Institute, and an animated though equally aimless discussion, evidences appear that our British friends are beginning to devote some attention, in a mild way, to water-gas. For years, the English technical public has bestowed upon the new fuel that good-natured indifference which springs from a conviction of great superiority. Few have condescended to listen. There appears to be considerable confusion in the minds of British metallurgists on the subject, and the only fact of any real importance brought forward and sufficiently indorsed to be received without reserve is, that water-gas has done good work in connection with the welding of wrought-iron.

THE proposed meeting of the manufacturers of coke in the Connellsville District proved a failure, because the representation was not great enough to make the deliberations of such an assembly carry any weight. The rapid decline of prices is the result of a struggle the outcome of which leaves but little doubt. The market will not take all the coke, and it has become the question who is to stop producing. There are two classes of coke-producers, those having "drift" mines and those having "shaft" mines. The former are undoubtedly in the majority of instances fully capable of placing their product on the market at a lower price, and are "squeezing" their less fortunate competitors, who will not long be able to meet 85 cents per ton, on cars at oven, a price which must entail a positive loss of from 8 to 18 cents per ton. The latter are in favor of restricting the output, to strengthen the market and get at least a small share of the trade, while the drift men are not anxious to make concessions while they are in a position to dictate.

RECENT advices from England indicate that the basic process is making exceedingly rapid progress in Europe. During the six months ended with the close of March, 279,400 tons of basic steel had been produced by seventeen firms; one of them in England, one in Belgium, one in Russia, two in France, three in Austria, and nine in Germany, their output being :

	Tons.
England	57,911
France	5,932
Belgium	12,786
Germany	152,479
Austria	37,476
Russia	12,786

These figures, of course, are insignificant as contrasted with the duty of the acid plants in the United States, though they do not compare unfavorably with the work of the majority of mills working side by side with them in Europe. The only establishment actually working on a good scale is the Eston works at Middlesborough.

A PRELIMINARY summary of the report of Mr. BURCHARD, Director of the Mint, on the production of the precious metals, has been published, the figures presented being the following :

	Gold.	Silver.
Alaska	$150,000	.....
Arizona	1,065,000	$7,500,000
California	16,800,000	845,000
Colorado	3,360,000	16,500,000
Dakota	3,300,000	175,000
Georgia	250,000	.....
Idaho	1,500,000	2,000,000
Montana	2,550,000	4,370,000
Nevada	2,000,000	6,750,000
New Mexico	150,000	1,800,000
North Carolina	190,000	25,000
Oregon	830,000	35,000
South Carolina	25,000	.....
Utah	190,000	6,800,000
Virginia	15,000	.....
Washington Territory	120,000	.....
Wyoming Territory	5,000	.....
Total	$32,500,000	$46,800,000

This shows a decline of $2,200,000 in the production of gold and an increase of $3,800,000 in that of silver, a favorable showing, considering the many circumstances which have told against the prosperity of the mining industries.

PIG-IRON in the East appears to be approaching "bed-rock," to judge from the fact that furnaces are blowing out rapidly, and the iron ore miners have reached prices so low that no material reduction is probable. The forced restriction will tell on values as soon as surplus stocks in the hands of the weaker producers have been marketed. Many months have now passed by, and hardly any of the season contracts for foundry iron generally made in spring have been closed. Consumers have been buying strictly from hand to mouth, taking one-hundred ton lots at a time, and their stock of raw material must be exceedingly light. In regard to the manufactured goods which our foundries produce, the situation is not quite so favorable, and it may take some time before the surplus is worked off. On the other hand, we are approaching that period of the year when the demand is liveliest, and the work of distribution will soon begin. We can not help believing that the worst has passed. The process of getting down to the present more healthy condition has been a painful one, and much unjust and indiscriminating criticism has been heaped upon the shoulders of those who have led in the movement. The policy adopted has, however, undoubtedly been the

most judicious. It has placed the business on a sounder basis, and has contributed much toward bringing about a more speedy return to better times.

YEARS ago, in their eagerness to tap from the earth its hidden treasures of oil, drillers generally expressed disgust when nothing but gas rewarded their efforts. Later, some enterprising men began to turn their attention to this great source of caloric, and, one by one, a number of iron and glass manufactories in Pennsylvania carried the gas into their mills. They have not made much bluster over what they were doing, and have quietly pocketed the increased profits which their saving of fuel, due to the use of gas, has given them. Of late, however, the subject is attracting considerable attention in a quiet way, and recent developments indicate that the territory which may possibly be able to draw upon the new source of fuel supply is much greater than is generally believed. Gas-wells have been opened and are utilized as far west as Detroit and as far south as West Virginia, and Pittsburg is now getting excited over the extension of the business of the Murraysville well in Westmoreland County. Pipes have been laid down to a number of glass and iron-works in the eastern part of the great Smoky City, and a rapid extension of the field of the gaseous fuel is looked forward to. The belief is expressed by men whose opinion is worthy of much consideration, that the number of localities capable of being supplied with gaseous fuel in the States of New York, Pennsylvania, Ohio, West Virginia, and Michigan is much larger than the majority have any conception of, and the permanency of the flow of some of the older wells gives rise to the hope that it is a reliable fuel supply. Its cheapness and cleanliness are, of course, matters which are beyond all doubt. There are indications that during the present year a considerable number of companies will form to sink wells, and a "boom" is looked forward to that may bring forth the usual crop of unsound enterprises.

THE ROANOKE MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

The nucleus of the town of Roanoke was a small village known as Big Lick, situated at a point where a salt-lick originally attracted the wild animals of the vicinity. About this gradually grew up a village of ten or fifteen houses, with a small hotel and store. In 1881, the population was about 600. The building of the Shenandoah Valley Railroad to a connection with the Norfolk & Western, forming a great through route between the North and South, opened a new era in the economic history of the district. The town of Roanoke rapidly increased, until now it boasts of a population of nearly 5000, with about 600 houses, a new and comfortable hotel, and numerous industrial establishments. It is situated in the midst of a highly cultivated region, immediately at the junction of the Norfolk & Western and Shenandoah Valley railroads.

It was at this point that the American Institute of Mining Engineers decided to hold its regular summer meeting. The ride through the Shenandoah Valley is full of interest, and the scenery is grand and picturesque. The railroad first reaches the Shenandoah River at Riverton; thence it follows its general course for 120 miles. It then crosses a divide 1785 feet above tide between the Shenandoah and James river waters, and it follows the tributaries of the James River and the James itself to Buchanan, a distance of 50 miles or more; it then ascends another divide between the waters of the James and Roanoke rivers, and thence by the tributaries of the Roanoke to its junction with the Norfolk & Western, being for the entire distance in what is commonly known as the Valley of Virginia. During the late war, this valley was the scene of active military operations, and the railroad line passes through or near the battle-fields of Antietam, Shepherdstown, Winchester, Cedar Hill, Cross Keys, and Port Republic. The route abounds in points of interest, not only to the traveler seeking simply the picturesque and the beautiful, but also to the geologist, the mining engineer, and the iron-master; for the railroad follows closely the great Primordial ore-belt along the western flank of the Blue Ridge, which at many points has shown large and valuable deposits of rich iron ore.

It was expected, therefore, that this meeting of the Institute at Roanoke would prove very attractive. Already at least 125 members—many of them accompanied by ladies—have arrived, and others are still expected.

THE FIRST SESSION.

The first session of the Institute was held in the Roanoke Hotel, on Monday evening, June 4th. Addresses of welcome were made by Mayor Cocke, on behalf of the municipal authorities, and by Mr. I. B. Austin and Major Griffin, on behalf of the citizens. The words of greeting were specially cordial, and they were happily responded to by Mr. R. W. Hunt, the President of the Institute. The President then read his inaugural address, which was very favorably received.

THE PRESIDENT'S INAUGURAL ADDRESS.

Upon assuming the duties of the high position to which you have elected me, I beg to thank you most sincerely for the honor conferred. To be the presiding officer of your society is a gratifying distinction; but entering upon that office as the successor of the able gentlemen who have preceded me renders me diffident as to the results of the ensuing term. But believing your hearts, rather than your cooler judgments, were consulted in making your selection, I, in self-defense, now rely upon them for forbearing criticisms where weak, and warm support where strong and right. Connected as most of us are with the active industries of the country, we are called upon to encounter, not only engineering problems, but commercial ones as well. In fact, the two are so intimately associated, the success of one is the triumph of both. For while engineering difficulties may be overcome, if the result is not a commercial success, the world refuses to grant praise, and certainly withholds substantial rewards. I presume never since the organization of this Institute has the metallurgical engineer been called upon to meet a more embarrassing condition of affairs than at the present time. We have been through panics, through periods of depresssion and times of inflation; but just now, owing to the legislative status, an entirely new element enters into the problem.

After the warm words of graceful welcome to which we have just listened, with the certainty of having displayed to us, during the next few days of our visit to their store-house of nature's treasures, such boundless mineral and agricultural wealth, made available by intelligent enterprise and industry, it is next to impossible to realize the existence of aught but untrammeled prosperity. Eight years ago, the President of this Institute, in his address at the Cleveland meeting, presented as he so well could, and in his clearest, most forcible manner, the necessity for a general adoption of better methods, more economical machinery and saving appliances in all branches of manufacture. His warning words were uttered at a time when the business outlook was much the same as now. During the years which have lapsed since then, many steps have been taken in the right direction. But a period of great prosperity, at least of great activity, came upon us. Nature's refreshing rains and glowing sunshine made our fertile plains rich with golden harvests. Thousands from foreign shores came to us, seeking new homes in our God-blessed land. There has been work for all, plenty for all, demand for every thing. The result was a feverish state of drive. Did the blast-furnace have a daily output of sixty tons, alter the lines—put up new stoves—another engine—force it—blow it—better still, build another and bigger one—produce two hundred tons per day! The Bessemer works were designed for and expected to make fifteen hundred tons of ingots per week. Put on three sets of hands, let the week of production begin on Sunday afternoon; the week of labor never end; and then, not be content with a weekly yield of three thousand tons. This has been the hot-blooded life of the past few years; but following it, have we not sometimes neglected true economy? If not, then well. But whether yes or no, the time is now here when we must have cheapness of production as well as quantity. I take it, no matter what may be our views on the subject of protection, the supreme duty of every engineer is to aim at placing our industries entirely independent of the whole subject. An easy statement to make—not so easy of accomplishment. But our duty remains the same. How can it be done? Most emphatically not by placing American labor on the same basis as foreign; not by employing women and children to perform the work not of men alone, but that of beasts of burden; not by giving our workers hovels instead of homes; not by depriving them of wholesome diet; not by rendering education and advancement all but impossible; not by breaking down the barriers of morality; not by making the united efforts of a skilled man, his equally skilled wife and daughter, capable of yielding but $5.13 per week! I am proud to believe the reduction of labor to this point would require a plant for the construction of which the average engineering mind is incapable. Unfortunately, when pinching times afflict us, when the necessities of curtailment of costs arise, we at once attack the wages problem as the certain and only way of salvation. That point of reduction of cost is so easily reached. Understand me; I do not mean that labor should not bear its share of depression, as it certainly always will of prosperity. But if we would give deeper thought, and not permit the human proclivity for hitting some other body satisfy us, we should make greater and more lasting savings. You may make a heavy reduction in wages, and save but a small amount per ton of product; and when times change, the reduction must be restored. But save a few per cent of loss in the processes of manufacture, and your aggregate is the same, and that reduction in cost remains permanent. By the difference between an unintelligent, careless, and indifferent use of the non-producing supplies in one engine and its train of rolls and a conscientious effort at economy, an actual saving of one hundred dollars per month has been possible. This is not a fortune; but if you have say forty engines and thirteen trains of rolls, it merits respectful consideration. Better let that master mechanic's wages remain at a fair standard and have him save for you, than to take from him and let another lose for you. Hence, I argue that the first duty is seeking after better methods, then a rigid and economical administration, and *then* a revision of the whole labor question. I think my statements as to not favoring a descent to the level of foreign labor have been sufficiently strong; but at the same time, I claim that the relative pay of our workers is not properly balanced. The machinists, the pattern-makers, the carpenters, the mechanics of America have to serve an apprenticeship of from three to four years, receiving during that time not more than enough to pay their board. After learning their trades, they can not hope for, in fact are satisfied with earning from two dollars and twenty-five cents to three dollars per day, the latter being for exceptionally skillful workmen, two dollars and fifty cents per day being about the average. Should these men develop sufficient talent, they may become foremen, at say $100 per month. Their employment demands physical skill, patient toil, frequently fearless exposure to physical danger, and a certain amount of intellectual education. The greater the latter, the more certain is the possessor of constant employment and success. From the daily wages stated, it of course follows that the yearly earnings are moderate. Nevertheless, in all manufacturing communities of this country, you will find that the mechanics are, as a rule, the men who have acquired homesteads, who live with the most comfort, and whose children are prepared for a higher plane than that occupied by their parents. It certainly seem unjust that, as opposed to such a class of workers, other men without intellectual education, with trades that, with scarcely an exception, if sufficient physical strength is possessed, can be acquired in less than a year, should control a rate of pay from one and a half to three times as great. The young man in the machine-shop cheerfully devotes his time, while learning his trade, for a compensation of some three dollars per week. His fellow in the rolling-mill, if over eighteen years of age, must receive from a dollar and a half to two dollars per day, or he will remain in idleness. To my mind, true justice demands that the wages of the skilled mechanic should be the basis in comparison with which the rate of all other labor should be determined. But to reach the sought-for plane, to place the manufacturers of this country in a position to compete in the open markets of the world, to render the question of tariff entirely one of revenue, one more

thing is absolutely necessary: We must have cheap raw materials. No matter how much engineering skill is exercised, no matter how economical the administration, no matter how low the rewards of labor, unless the coal, the ore, the pig metal, are obtained at a far lower price than we now know, our market must be limited to our own domain, and the foreign importer must be handicapped by an impost; or else our furnaces must remain cold, our mills idle, and the mines of either my own New York or those of hospitable Virginia lie undeveloped.

To give us this cheap material, other than labor must be content with smaller returns. If the ore property is acquired for say fifty thousand dollars, the company formed to develop it must not have a capital of a million, and each stockholder expect at least ten per cent on his watered investment. I fully appreciate that this is not likely to be received with favor; but if the demand is for steel rails at about twenty-five dollars per ton, to meet it the manufacturers must have pig-iron at the English price of say from twelve to thirteen dollars. Then, with the American converter, averaging 42,705 tons, against 20,920 for the English, and 15,001 tons for the French per year, there need be no fear but the American product can compete in any market, and at the same time pay labor as American labor should be rewarded. It has been demonstrated that freight can be carried over our railroads, and profits made, at a rate per mile that a few years ago seemed impossible. Our country is one of long distances. The various raw materials are generally far apart, or else the market is distant. Hence railroad engineers and managers have already contributed their share toward solving a problem which, view it as you may, is one of at least not easy solution. The bounden Christian duty of every one, in whatever sphere he may be placed, is to properly administer the talents given unto him. The seeking after the best methods in all things is imperative on all. But have we not cause to be proud of the development of our country, and reasonably well satisfied with the results? Coming, as we distant members of this Institute do, to partake of the hospitality and witness the Aladdin-like achievements of our hosts of this section of Virginia, are we not inclined to conclude that the system which has rendered such things possible is fit to live? If so, then, gentlemen, we must resort to political as well as engineering methods.

The advisability of such a policy has been recognized by at least one association of capitalists. The furnaces and mills located on the Hudson River, while possessing many advantages of location, have been handicapped by high-priced fuel. This must ever remain—and in the struggle of the survival of the fittest, there could be but one other element to offset this disadvantage. If cheap and good ore could be obtained, the distance from the coal-fields would be more than neutralized. To Mr. James A. Burden, of Troy, belongs the credit of a methodical investigation, rewarded by complete success, which promises to make the Hudson Valley one of the most favorable points for the production of cheap and good iron in the United States. The gentlemen associated with Mr. Burden in the possession of the Hudson River ore property, and also the Chateaugay property, believe that their true interests point toward a large output at a small profit. Fortunately, the mixture of the Chateaugay and Hudson River ores in about equal proportions furnishes an easy working burden, and yields good foundry, mill, and Bessemer irons.

Taking Troy as a point at which these ores may be brought together and smelted in properly constructed furnaces, costs can be figured about as follows:

1 ton of Chateaugay 1 ton of Hudson River	$6.50
1¼ tons of coal	5.00
Limestone	.50
Ore, tools, etc	.50
Labor	1.50
Repairs, etc	1.00
	$15.00

If Mr. Burden's policy is adhered to, it would seem as though hope still exists for some of us.

Papers were afterward read by Mr. A. S. McCreath on the Iron Ores of the Valley of Virginia, which we print in this issue, and Capt. C. R. Boyd on the Ores of Cripple Creek, Virginia.

On Tuesday morning, a visit was made to Lynchburg, on a special train, provided by the courtesy of the Norfolk & Western Railroad. Here the Lynchburg blast-furnace was visited.

THE LYNCHBURG BLAST-FURNACE.

The stack is 60 by 12 feet 6 inches. It has four tuyeres with 4½-inch nozzle. The blowing-engine has a steam cylinder 20 inches in diameter, with four-foot stroke, and a blowing-cylinder 60 inches in diameter, with four-foot stroke. The engine was built by the proprietors of the furnace, Messrs. Carter & Stevenson. The ores used are chiefly brown hematites, mined along the line of the Richmond & Alleghany Railroad. They yield an average of about 47 per cent metallic iron. The fuel used is Connellsville coke. The furnace produces 35 tons daily of soft foundry iron.

THE RIVERVILLE IRON MINES.

A visit was then made to the iron mines on the James River near Riverville, a special train having been kindly furnished by the Richmond & Alleghany Railroad. The mines visited are located at a point about two miles from Riverville, and twenty-four miles northeast of Lynchburg. The ore is of the specular variety, and may yield from 45 to 50 per cent metallic iron, with the phosphorus sufficiently low to make it suitable for Bessemer pig-iron.

At Riverville, an excellent collation was provided by the citizens of Lynchburg, whose guests we were for the day. After the wants of the inner man had been satisfied, a few speeches were made, cordially welcoming the members of the Institute. Numerous points of interest were afterward visited in Lynchburg, notably the Chamber of Commerce, where a fine exhibit of different kinds of minerals was displayed. We returned to Roanoke in the evening, too late for a second session, which had been arranged to be held at Lynchburg, but which was unavoidably omitted.

To-morrow (Wednesday) will be spent visiting points of interest around Roanoke, including the new furnace of the Crozer Steel and Iron Company, the Roanoke Machine-Works, and several iron ore deposits in the immediate neighborhood, which will be fully described hereafter.

ROANOKE, VA., June 5, 1883.

THE RAILROAD EXHIBITION AT CHICAGO.

Special Correspondence of the Engineering and Mining Journal

The Exhibition is now thoroughly under way, and is attracting attention of a character to meet the most sanguine expectations of its managers. The time having been extended until the evening of the 5th in which to complete exhibits, there has been considerable activity among exhibitors to make the best display possible. In variety and character of exhibits there is every thing to be seen which is of interest, not only to the railroad man, but to many who are engaged in kindred and allied mechanical pursuits, The visitor may profitably pass two or three days in the exhibition building, and then depart without having done full justice to the many novel details of railroad construction now brought forward. The attendance has not yet developed much of a railroad character. Next week will, however, witness a large influx of this class, who will express no little praise at the novelty of concentrating under one roof so much in which they are specially concerned.

It may afford your readers some satisfaction to learn who among the numerous exhibitors are enterprising to the extent of meeting the best attention. Among locomotive-makers, first and foremost in its display, I may allude to the Brooks Company, of Dunkirk, N. Y., which has four of its engines in the Annex that attract marked attention. The Philadelphia & Reading Coal and Iron Company has a handsome engine, No. 372, of its own make, possessing special features. The engine is said to accomplish work not in the reach of many of its kind, and boasts of very high records. Other manufacturers have their engines on exhibit, which in all make a most creditable appearance in this line. The Brown Hoisting and Conveying Machine Company, of Cleveland, Ohio, has on exhibit its machine on a tramway, which enables it from time to time to practically illustrate its workings to the visitors who admire its simplicity in the execution of its work. Creaser, Adams & Co., of Chicago, have a large booth located in the center of the building, in which are displayed the various fixtures adapted to railroads, mines, etc. Fairbanks, Morse & Co. have an immense tank supplied with water by an Eclipse wind-mill, one of the prominent features of the exhibit. That live house of St. Louis, M. M. Buck & Co., has a handsome exhibit of heavy railroad and engineer's supplies, and Keuffel & Esser, of New York, are prominent by the fine character of their engineering instruments and supplies; they display a full line of such articles as enter into the wants of engineers, among which are many specialties controlled by them.

In minerals, ores, and the like, there is a very fair display from the Lake Superior and Northern country. The success of the electrical railroad may now be considered assured.

A COMPARISON OF THE WORKING OF A BLAST-FURNACE WITH BLAST VARYING IN TEMPERATURE FROM 990° FAHR. TO 1414° FAHR.*

By W. Hawdon, Middlesborough.

(*Concluded from page* 317.)

In order to ascertain if the temperature of the escaping gases was affected by the increased temperature of the blasts, tests were made over a period of twelve hours, and taken every fifteen minutes or thereabouts. The temperature of the escaping gases varies so much over any given period that a test taken at random, or even over a couple of hours, is very misleading. The time of lowest temperature is, of course, when a large amount of material has been charged into the furnace. This, in the course of ordinary working, is as low as 323°, and gradually increases during the time that charging operations are suspended. The results of trials taken throughout the day, October 31st, 1882, when the average temperature of the escaping gases was 490° Fahr., show that the average temperature of blast was 1065° Fahr. As the rise in temperature is gradual after charging has ceased, the trials were not so frequently made, but that is allowed for in taking the average temperature.

The temperature of the gases was taken in a similar manner over twelve hours on other occasions, showing:

	No. 1.	No. 2.
Average temperature of gas	468° Fahr.	448° Fahr.
Average temperature of blast	1139° Fahr.	1493° Fahr.

From this it would appear that the temperature of the escaping gases decreases with the decrease of fuel, although this decrease of fuel is compensated for by an increase of blast temperature.

The volume of the escaping gases is smallest when the higher temperatures of blast are used, since, when this is the case, the amount of fuel consumed is smallest, and consequently the amount of air blown in to consume this fuel is smallest. The weight of gas per ton of iron we find to be 133·3 cwts., when the blast is 1376° Fahr.

The volume of the escaping gases is largest when the blast temperature is low, since, when this is the case, the amount of fuel consumed is larger, and consequently the amount of air blown in to consume this fuel is also larger. The weight of gas per ton of iron we find to be 140·8 cwts. when the blast is 990° Fahr.

In both cases, the gases, in passing up the furnace, pass through the column of material, namely, coke, mine, and limestone, which is charged at the top of the furnace.

The materials, in passing down the furnace, absorb practically the same amount of heat in both cases. But since the volume of the escaping gases in one case is less than the volume in the other, the temperature of the gases when they are leaving the furnace will be lower when the volume is small than when it is greater, granting, at the same time, that the furnace is of sufficiently large capacity to allow of absorption with the quicker driving—that is, when the gases are passing off more rapidly.

In order to ascertain how much of the iron-stone remained uncalcined after it had passed through the calcining-kilns, samples were taken in bulk in the following manner: Three shovelfuls of mine were taken from each of the six openings of the kilns, and the whole thoroughly mixed. This operation was repeated at each kiln. About one quarter of the mine from each kiln was taken for sample and thoroughly mixed together. This was crushed in a mortar-mill, and a sample taken to the

* Read before the British Iron and Steel Institute.

laboratory. An average of five such samples of calcined stone, as determined by Mr. Stead—to whom I am indebted for the analyses given in this paper—gave the result:

	Per cent.	Cwts. per ton.	Oxygen.	Carbon.
Fe_2O_3	49·38	24·01	7·20	....
FeO	4·72	2·30	0·51	....
CO_2	2·98	1·45	1·06	0·39
Loss by calcination	3·11	1·51	....	....
SO_3	0·66	0·32	0·19	....
	....	....	8·96	0·39

This gives metallic iron = 38·13 per cent.

The CO_2, of course, passes off at the top of the furnace, and affects the calculation in computing the weight of carbon which passes down to the tuyeres. It is therefore necessary, in computing the value of the gases, to make the allowance for this uncalcined stone.

The unburnt stone is chiefly found in the center of the large lumps, and although the stone may appear almost perfectly calcined, yet in the best-constructed kilns from 2 to 3 per cent is generally found to be the further loss when a sample taken from the kilns is submitted to perfect calcination in a muffler. Samples were taken from the kilns at two other works in Middlesborough, when the stone was well burnt, and gave a further loss of 1·8 and 2·8 per cent respectively.

The practical work accomplished in this furnace by increasing the temperature of the blast from 990° Fahr. to 1414° Fahr. has been a saving of 1½ cwt. of coke per ton of iron, and an increase in make of 60 tons per week, with a better quality of iron by nearly one fourth of a grade, and that, too, without any increased reduction of silicon into the iron, though it would appear that rather more limestone is required when the higher heats are used.

It becomes now an easy matter to calculate whether it is worth while pulling down old pipe-stoves at any particular stage of wear and tear, and replacing them with the effective brick-heating stove of the Cowper, Whitwell, or similar type.

A very important item in connection with the working of brick regenerative stoves in place of the ordinary U-pipe stove appears to have escaped general observation. I refer to the amount of gas required to heat the blast by this method.

The pipe-stoves in use at the Newport Iron-Works are of modern construction, and may be taken as among the best of the kind. There are nine to each furnace, eight of which are at work while one is off for cleaning purposes. Each stove has twelve pipes, with a heating surface of 100·48 square feet per pipe = 1205·76 square feet per stove, giving 8×1205·76 = 9646 square feet of heating surface per furnace.

The cubical contents of each stove = 1781 feet. That of the pipes in each stove = 320 cubic feet, which, deducted from the former, gives 1461 cubic feet in each stove to be filled with the gases in combustion. This gives 8 × 1461 = 11,688 cubic feet per furnace. Therefore the proportion of heating surface of the pipes is to the cubical capacity of the stove as 9646 square feet heating surface : 11,688 cubic feet capacity of stoves, or as 1 : 1·21.

Now in the Cooper stoves, which are at work at this furnace, one working the blast while the other is heated with the gas, there are 42,860 square feet of available heating surface per stove.

The cubical capacity of each stove is	18,610	cubic feet.
That of the brick is	8,406	"
Difference	10,204	"

Therefore the proportion of heating surface is to the cubical area as 42,857 square feet : 10,204 cubic feet, or as 4·2 is to 1, as against 1 : 1·21 in the other case, showing a great economy of space to be filled by gas under combustion in the brick stove. And moreover, the outside surface of the brick stoves is much less than that of the pipe-stoves, giving thereby less surface for radiation. In the pipe-stove, there is not a sufficient length of time, nor is the surface of the pipes of sufficient area to allow of the complete absorption of heat from the burning gases. But the gas which is ignited at the bottom passes rapidly and directly through the stove and out of the chimney at the top, where it escapes at the high temperature of 1240° Fahr.; while with a well-designed brick stove, the gas has a long way to travel, a large surface of bricks to pass over, travels at a much slower rate than is the case in the pipe-stove, and consequently the heat is so thoroughly absorbed by the bricks that the gases escape into the chimney at a temperature (from the Newport stoves) of 250° Fahr.

The escaping gases analyze as follows:

	From the pipe-stoves.	From the Cowper stove.
N	74·24 per cent.	74·75 per cent.
CO_2	24·30 "	24·15 "
CO	Nil "	Nil "
O	1·46 "	1·10 "
H	Nil "	Nil "
	100·00	100·00

Showing in both cases very little excess of air.

In order to ascertain the amount of gas passing through the various flues to the stoves, boilers, etc., readings were taken by Swan's tube anemometer, with the result that the sum of the amounts passing down the gas tubes from the two furnaces in blast showed only an excess of 3·6 per cent over the sum of the amount passing into the various stoves and boilers, thus showing comparative accuracy in the readings. The anemometer showed exactly the same amount of gas passing down the gas tube from each furnace.

The pipe-stoves at work on the No. 6 furnace are identical with those formerly at work on No. 8. One of them was off for repairs, and one cleaning, leaving seven at work.

Taking the sum of the amounts of gas passing down the two gas tubes as unity—they being the source of supply—we have—

To the Cowper stoves	14·9 per cent.
To the seven pipe-stoves	23·4 "
Through the gas-flue to the boilers	61·7 "
	100·0

Now we find that the gas per ton of iron passing from No. 8 furnace = 133·3 cwts., the anemometer reading being taken at the same time, giving at the rate of 266·6 cwts. per ton passing from the two furnaces as our gas supply. The sum of the two amounts = at the rate of 266·6 cwts. gas per ton of iron to each of the set of stoves which respectively supply one furnace; but in the case of the boilers, the number of tons is at the same time doubled, the steam supply from the boilers being to both furnaces, the make at the two furnaces being nearly the same.

This gives us—

	Cwts. gas per ton of iron.
To the Cowper stoves	39·63
To the seven pipe-stoves	62·25
Through the gas main to boilers	164·12+2
	266 cwts.

Taking first the Cowper's stove. From the gas analysis, 27·34 per cent is CO = 11·71 C. This per cent of 39·63 cwts. = 4·64 cwts. carbon. Hence we have developed:

	Cwts.	heat units.
(CO to CO_2) 4·64 × 5600	=	25,984
Hydrogen	=	1,056
Sensible heat of gas, 39·63 × 102° C × ·24		970
		28,010

We have carried out heat units from—

		Heat units.
Blast (746° + 42° loss from stove to tuyere) = 788° C × 98·17 × ·237		18,333
From waste gases	39·63 cwts.	
Add weight of air required to consume 4·64 cwts. C from CO to CO_2 and 0·03 cwt. H, and due to 1·1 per cent excess of O in waste gas	29·24. "	
	68·87 "	
68·87 × 140° × ·24		2,313
Leaving for radiation		7,364
Total		28,010

Take now the pipe-stoves: 11·7 per cent of 62·25 cwts. = 7·28 cwts. carbon. This develops (CO to CO_2)—

	Heat units.
7·28 × 5600	40,768
Hydrogen	1,700
Sensible heat in gas, 62·25 × 102 × ·24	1,523
	43,991

We have passing out—

	Heat units.
Blast, 531°C × 105 cwts. × 237	13,960
Waste gases (62·25 + 49·9 = 112·15 cwts. × 671° × ·24)	18,061
Leaving for radiation	11,970
	43,991

In this latter case, 105 cwts. of blast is taken as used, as is the case with the lower temperature of blast.

The difference (62·25 — 39·63) = 22·62 cwts. gas per ton of iron, represents the amount of gas saved by using the brick stove in preference to the pipe-stove, and might, with proper application, be used for calcining the iron-stone, where that is necessary, or for other purposes.

Now 22·62 cwts. is 16·9 per cent of 133·3 cwts.; or, in other words, the saving effected by heating the gas in the brick stoves is equal to 16·9 per cent of the whole of the gas given off from the furnace. Of this 26·3 per cent is CO = 6 cwts. CO per ton of iron, which, when burnt to CO_2, gives 2·57 C × 5600 = 14,393 cwts. heat units.

The calorific power of the small coal used in the Cleveland District for calcining purposes may be taken at 7000; so that if this heat were applied to calcine the iron-stone, it would represent $\frac{14,392}{7000} = 2$ cwts. (about) of small coal per ton of iron made. At the Newport Works, we use 2¼ cwts small coal to calcine the iron-stone required to make one ton of iron. At some works with high kilns, as small an amount as two cwts. is required. A certain amount of this, doubtless, passes off burnt to only the first degree, or CO. Therefore, we find that the saving in gas by using the brick stove is about the quantity requisite to calcine the iron-stone for use in the furnace. The ordinary type of calcining kilns is without doubt unfitted for this mode of firing; but it does not appear unlikely that kilns can easily be adapted for the purpose. A great advantage is found in using the brick stoves during the prevalence of high winds, owing to the better draught of the chimney, when, as every furnace manager knows, it is impossible to maintain the heats with the ordinary type of U-pipe stove. We may therefore congratulate the inventors of brick regenerative stoves on having introduced an improved mode of heating the air, though the advantage, when compared with the cast-iron pipe-stoves, where the services they render give such fair results as from 1050° to 1100° Fahr. of blast temperature, is not, according to our experience, equal to that which has in some instances been claimed for them. As an instance of the saving effected, we will take the No. 8 furnace at Newport Works; the Cowper stoves are built of best Wortley fire-bricks, and the whole workmanship is of the best quality. They cost £2200 each = £4440 per furnace, without the foundations, which were already in; and the chimney, which is large enough to drive stoves for three furnaces, cost £270.

	Per year.
Interest and depreciation on the Cowper stoves at 15 per cent	£700 0 0
Interest and depreciation on the pipe-stoves at 15 per cent	495 0 0
Difference	£205 0 0
Saving in coke, as in the Newport case, 1½ cwt. per ton = 11¼d. One fourth better grade in quality = 3d. per ton. Total saving, 14¼d. per ton. On 400 tons per week, say, 20,600 tons per year	£1,223 2 6
Deduct	205 0 0
Total saving per annum in favor of the brick stoves	£1,018 2 6

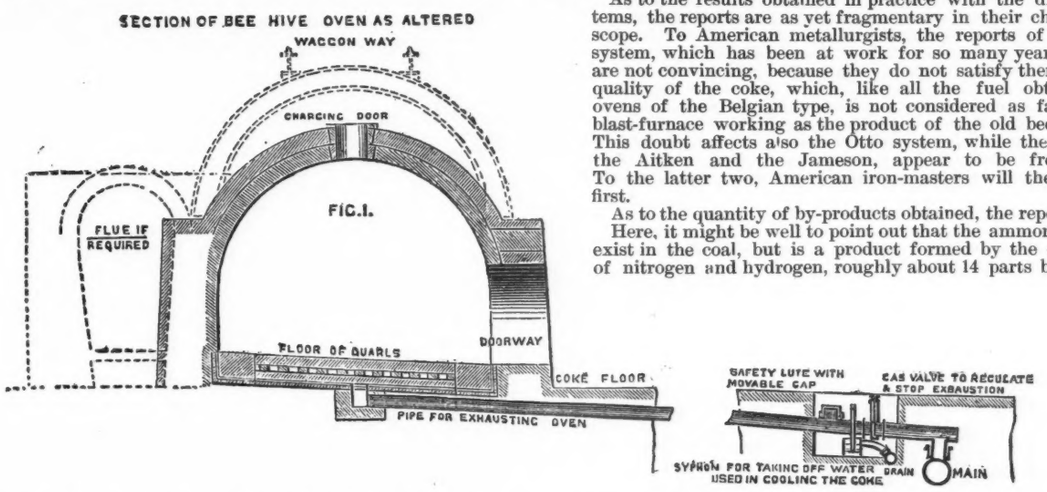
There remains, in addition, the saving of gas, which, if properly applied, is no inconsiderable item, and the profit—when such a desirable result is accomplished—on the extra make.

AT a recent meeting of the Engineers' Club of Philadelphia, Percival Roberts, Jr., exhibited a turning from a cast-steel roll. The dimensions of the roll, which was cast from open-hearth steel, were about 30 inches by 5 feet 6 inches. The turning is 4 inches wide by 12 inches long, ½ inch thick, showing the roll to have been very homogeneous for cast-steel.

UTILIZATION OF BY-PRODUCTS IN THE MANUFACTURE OF COKE.—III.

The Jameson System.—The latest claimant for attention in the recovery of the volatile products in coking is J. Jameson, who also attempts only a modification of the ordinary bee-hive oven, and whose particular aim appears to be to keep the coking process precisely the same as in the old plan. Mr. Jameson rejects the use of the fuel-gas remaining after the tarry and ammoniacal products have been condensed, on the ground that the heat which can be generated by the burning of this waste gas, being previously cooled, is not sufficiently high, compared with that obtainable by burning a part of the carbon of the charge. He says also that the portion of the coke formed at a low heat in a comparatively cool fresh-charged oven is inferior in quality to that produced at a higher heat at a later stage of the coking.

Figs. 1 and 2 show a sectional elevation and plan of the Jameson oven,



from which it will be seen that, in place of being solid, the floor is perforated by numerous holes formed in fire-clay quarls, a suction-pipe of cast-iron being inserted so as to communicate with the openings. It is important to have a secure and tight foundation, in order to avoid drawing air and vapor from the surrounding ground; and this is accomplished by placing a double layer of bricks set in hard pitch at such depth below the actual floor as not to be exposed to undue heat. In building new ovens, it is also considered advisable to lay one or two damp courses of slate and tar, such as are used in house building, over the whole surface of the foundation. The oven is charged as usual; and when well ignited, a slight exhaustion is applied at the bottom through the pipe previously referred to, so as to remove a portion of the nascent products of distillation, instead of allowing them to pass up through the ignited portion of the charge. The suction should be equivalent to about 200 cubic feet of gas per hour per ton of coal in operation, but must, however, vary somewhat with the quality of the coal, some coal being more rich in gas than others. The amount of suction capable of being applied should be about three inches of water; good results have been got with about half an inch; but for resistance in the scrubber and a margin for seals, the power available should not be restricted to that in the first instance. The suction, beginning as soon as the oven is well ignited at the top, should be continued for at least sixty hours for a five-ton oven, although the charge may before that time be ignited throughout, there being still a yield of oil apparently re-distilled from the oven bottom. It is considered best to employ for suction such apparatus as a Root blower, or an exhauster of the Beale pattern, the delivery of which will vary nearly as the speed, as there is, of course, one rate of suction most favorable with each kind of oven and species of coal operated upon, and this should be secured as nearly as possible.

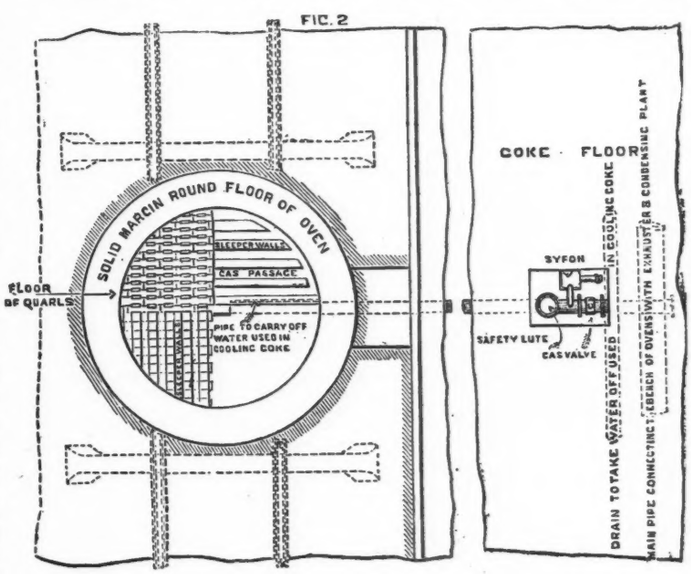


FIG. 2
SOLID MARGIN ROUND FLOOR OF OVEN
SLEEPER WALLS
GAS PASSAGE
PIPE TO CARRY OFF WATER USED IN COOLING COKE
FLOOR OF QUARLS
COKE FLOOR
SYFON
SAFETY LUTE
GAS VALVE
DRAIN TO TAKE WATER OF FUSED COKE
MAIN PIPE CONNECTING EACH OF OVENS WITH EXHAUSTER & CONDENSING PLANT

The temperature of the gas as it leaves the ovens averages about 180 degrees Fahr.; and as, in order to obtain the best results, it is important to condense as much as possible, it is recommended that very efficient cooling surface should be provided. If cold water is available at moderate cost, it is of value, especially in extracting the last traces of the more volatile products, bearing in mind that, contrary to the usage of gas-works, it is in this process desirable to take from the gas as much condensible matter as possible. By tapping the condenser at different hights, a certain separation of light and heavy oils may be obtained, which is valuable when dealing with large quantities. Probably the best method of obtaining the separation is by the process of fractional distillation now worked by Messrs. H. L. Pattinson & Co., at Felling, by which liquors of five or six different specific gravities can be automatically run into separate receiving-vessels. This process simply consists in providing discharge-lutes at so many places in the condensing-pipes, the more easily condensible constituents being run out of those nearest to the ovens, and the more volatile parts at a later period when the temperature has been still further lowered. Finally, the gas is passed through a dry scrubber, and may then be used for heating purposes, for working gas-engines, or for illuminating in connection with burners, such as the Lewis & Clamond, in which light is obtained by the incandescence of platinum or some other artificial medium instead of from the carbon contained in the gas. In some cases, the residual gas might be of greater value for concentrating the ammonia-water, which, on first condensation at the ovens, is large in quantity, and therefore costly to transport.

As to the results obtained in practice with the different systems, the reports are as yet fragmentary in their character and scope. To American metallurgists, the reports of the Carvès system, which has been at work for so many years in France, are not convincing, because they do not satisfy them as to the quality of the coke, which, like all the fuel obtained from ovens of the Belgian type, is not considered as favorable for blast-furnace working as the product of the old bee-hive oven. This doubt affects also the Otto system, while the two others, the Aitken and the Jameson, appear to be free from it. To the latter two, American iron-masters will therefore turn first.

As to the quantity of by-products obtained, the reports vary.

Here, it might be well to point out that the ammonia does not exist in the coal, but is a product formed by the combination of nitrogen and hydrogen, roughly about 14 parts by weight of the former to 3 of the latter. The whole of the nitrogen existing in the coal is not, however, converted into ammonia, although there is always more hydrogen present than would be necessary for this total combination. Only a portion is thus utilized, part of the remainder escaping unaltered, while some part clings to the coke, and a small fraction combines with carbon to form cyanogen. This matter was fully treated in a paper read by Professor Forster, M.A., F.C.S., before the Chemical Society of London, last December, and we understand that still further investigations are now in progress.

Mr. Henry Simon reports that at Bességes nearly 3 cwts. of ammoniacal water and 72½ pounds of tar are obtained per ton of coke. In preliminary work with the Otto system at Wattenscheid, Germany, the quantity of tar obtained ranged between 3·13 and 3·90 per cent of the weight of the coal, while the value of the ammoniacal water averaged 10·93 marks on a coal which was worth 60 marks per ton at the pit's mouth. Mr. Aitken got 11 gallons of oil per ton, and 30 gallons of water, containing in one test ammonia equivalent to 9·7 pounds of sulphate of ammonia per 100 gallons of water. Mr. Jameson reports that with Shiremoor coal, 13 gallons of crude oil, and ammonia equal to 9·87 pounds of sulphate, were obtained per ton of coal; while with Longhirst small, 9·28 gallons of oil, and ammonia equal to as much as 17·78 pounds of sulphate, were recovered. With fractional distillation, the results are especially interesting, and the following is given as a sample experiment with one charge:

Number of delivery-pipe.	Quantity collected.	Specific gravity.	Remarks.
	Gallons.		
1	5·00	1·015	Contained 18·6 per cent of water, and a great quantity of scale paraffine.
Close to oven			
2	9·87	·990	Contained 1 per cent of water.
3	7·70	·980	Contained 10·4 per cent of water.
4	2·00	·945	No water.
Dry scrubber	6·00	·960	Contained 1 per cent of water.

Altogether, the ammonia in this charge was equal to 12·2 pounds of sulphate per ton of coal.

ORE-DEPOSITS OF SUMMIT DISTRICT, RIO GRANDE COUNTY, COLO.*

By R. C. Hills. Condensed for the Engineering and Mining Journal, by S. F. Emmons.

The Summit District, which is situated near the summit of the San Juan Mountains, to the west of Alamosa, and south of the head of the Rio Grande above Del Norte, is famous for the remarkably rich gold deposits of the Little Annie and other mines. Mr. Hills's paper, which is too voluminous to be presented in full in these columns, is devoted to a consideration of the geological relations and genesis of ore-deposits of this region, and is based upon extended examination, and chemical investigation conducted by himself.

His views are, briefly, that the vein-like forms of auriferous quartz constituting these deposits have resulted from alteration and mineralization of an eruptive rock by solutions circulating along a contact plane; that subsequent folding and erosion gave rise to the existing series of parallel quartz bands, which have much the appearance of true veins.

In the accompanying diagrams, Fig. 1 shows the relative position and the sinuous course of the outcrops of the various rocks and the so-called veins. Fig. 2 is an ideal section along the line *a b*, illustrating the manner of folding and the number of plications.

The ore-deposits are principally confined to the northern and eastern slopes of South Mountain. The rocks of the region are all eruptive, and belong to the middle of what he calls the Tertiary eruptive series of Southern and Western Colorado. Those exposed in the immediate vicinity of the mine occur in the following order, beginning with the oldest:

1. *Andesite*, of dark green or black color.
2. *Granular rhyolite*, with large twin crystals of sanidine, and granules of quartz, biotite, hornblende, and apatite.
3. *Trachyte breccia*, not always present in cross-section.
4. *Andesitic trachyte*, with large crystals of sanidine and biotite, and a ground-mass composed mostly of plagioclase.
5. *Black rhyolite*, constituting a semi-vitreous ground-mass, with crystals of sanidine and biotite.
6. *Gray andesitic trachyte*, the most recent rock exposed in the district.

The aggregate thickness of these rock does not exceed 300 feet.

Horizontal pressure, acting in a northeast and southwest direction (that of least resistance), has produced six complete folds and a series of minor undulations. Similar pressure, acting at right angles, or in a northwest and southeast direction, has caused a further plication, which is shown in the sinuous course of the outcrops.

As shown in the section, the apexes of all the folds have been removed by erosion; the only exception being that of the Columbia-Treloar fold where the quartz apex still remains on the Golden Queen claim. These folds are shown sometimes in natural cross-section, as in the Bobtail and Major, and at other times by tunnels driven at right angles to the course of the veins. The metalliferous quartz bands are conformable with the folded strata, and occur along the plane of contact of the granular rhyolite with the breccia or with the andesitic trachyte, when the breccia is absent. The thickness of these silicified bands varies from three to thirty feet, being much greater when, by the folding process, two or more layers of quartz are forced into contiguous position.

The quartz bands, which correspond to the ground-mass of the rhyolite, are usually of compact structure. The quartz granules of the original rock may still be detected in the compact matrix, while the large crystals of sanidine, so conspicuous in the unaltered rhyolite, have for the most part disappeared, although their former existence is indicated by the numerous cavities still retaining the form of the feldspar. In some cases, pseudomorphs of quartz after the Carlsbad twins occur, but mica has entirely disappeared. The ore consists of auriferous pyrite and enargite, with their oxidation products. As accessory minerals are sphalerite and galena, and occasionally native sulphur.

The zone of oxidation to which all the more valuable bonanzas thus far discovered are confined is of varying depth, reaching a maximum of 300 feet. In the Little Annie and Little Ida claims, which are on the same plane, gold is most abundant near the center of the band; sometimes, it consists of innumerable small grains, so closely aggregated as to appear like a continuous sheet of metal. At the actual outcrop is the zone of impoverishment, which extends down to a depth of 50 feet or more, in which the quartz, while slightly impregnated with oxide of iron, is not sufficiently auriferous to constitute valuable ore. As an exception to this rule, in the Little Annie and Major claims, the oxidized ore at the surface is extremely rich; in the former, it is colored reddish-brown by oxide of iron, and often contains barite. Gold is mostly confined to fracture planes containing oxide of iron, and is found occasionally in dodecahedral crystals a millimeter in diameter. Near the ore-bodies, the decomposition has progressed more or less in the country-rock; and in their immediate vicinity, the feldspars are completely altered to kaolinite. Traces of lime or potash are seldom obtained from these decomposed rocks, and biotite is invariably altered to white potash-mica or muscovite. Kaolinization is not confined, however, to the immediate vicinity of the bonanzas, but is taking place on a large scale in districts at considerable distance from the ore-bodies.

In the Missionary and Golden Star claims, are two vertical veins running about north and south, which traverse the andesite and granular rhyolite, and connect with the quartz band in the latter. There are several other such vertical veins in the district, filled with kaolin or a little calcite and earthy matter, but none besides these two seems to have been mineralized. In the Missionary tunnel, the compact quartz matrix is from five to seven feet wide, passing insensibly into andesite, from which through alteration it has been produced. Its metallic minerals are pyrite and enargite, with more or less gold and silver, the latter being associated only with enargite. As far as known to the writer, there is no evidence of silicification or deposition of ore along the contact of the granular rhyolite with the underlying andesite.

He considers that these two characters of deposits, the contact quartz bands and the vertical veins, have a common origin and are of contemporaneous mineralization; that the absence of quartz granules in the feldspar cavities and of pseudomorphous minerals in the vertical veins may be accounted for by the difference in the character of the micro-crystalline andesite in which they occur. The vertical veins as a rule are found traversing the anticlines, but do not occur in the synclines.

With regard to the folding of the rocks, the evidence shows that, while in the earliest stages it may have advanced gradually, it culminated with considerable violence. In some cases, on the south side of the mountain, for instance, the rocks are shattered with such violence as to pile the whole mass into a promiscuous heap. It is not at all likely that these resulted from an earthquake movement subsequent to the folding, as the shattered rock is confined to the area embracing the undulations. It is impossible to conceive that mineral waters could be confined to the contact plane in the present position of the rocks; and the conclusion is therefore forcibly arrived at that the folding must have followed the silicification and ore deposition. The perfection with which the form of the Carlsbad twins is retained both by the quartz pseudomorphs and the numerous cavities present in the quartz is opposed to the notion that the mass has undergone any considerable contraction since the removal of the bases, although it is evident that more silica is contained in a given bulk of the ground-mass than was originally present in the same bulk of rhyolite base; and at the same time, it does not seem reasonable to suppose that more than a very limited amount was derived by precipitation from the altering solution. The minuteness of the crystals and the evidence of crystalline structure in the mass of the quartz, with other facts, suggest that their formation is due rather to a rearrangement of the molecules since the silicification. It is, therefore, fair to conclude that much of the silica contained in the sanidine crystals has, in a mechanical sense, taken the place of the bases in the ground-mass; in other words, that silicification has been brought about mainly by removal of the bases only.

Mr. Hills's remarks on the chemical reactions involved in the alteration and mineral deposition are too extended to be given at length. One of his main points is, that these altering solutions must have contained a certain amount of free sulphuric acid, for the reason that the bases, especially of alumina, have been removed, while silica has been left.

Silica is soluble to a limited extent in solutions of alkaline carbonates, which, however, do not affect silicate of alumina. Silica, on the other hand, is practically insoluble in solutions of alkaline sulphides and chlorides, and those containing hydrogen sulphide and free sulphuric acid; while in these solutions silicate of alumina is decomposed, and a soluble sulphide or chloride of alumina formed. Sulphuric acid may have been generated through the oxidation of hydrogen sulphide, the former existence of which may be argued from the presence of native sulphur. The disappearance of mica furnishes conclusive evidence that free sulphuric acid must have existed in the silicifying solution. The experiments of G. Rose and Kobell, as quoted by Bischof, show "that while biaxial mica resists the action of the stronger acids, uniaxial mica is completely decomposed by digestion with sulphuric acid." From this it seems that, if carbonic acid determines the decomposition of biotite, potash-mica will result; but if sulphuric acid is the decomposing agent, it may be entirely removed, as is the case in the quartz masses of the Summit District. In respect to the metallic sulphides, it is obvious, from their presence in feldspar cavities, that they have been deposited there since the alteration of the rock, and possibly under somewhat different circumstances. Those which exist in the compact matrix, however, may have been precipitated during the alteration. These may have existed as sulphates associated with alkaline sulphates, or may have been precipitated from a solution of alkaline sulphides or sulphureted hydrogen. The latter seems the most plausible supposition, as the abundance and minuteness of pyrite and enargite crystals show that decomposition took place very rapidly, and the reduction of sulphates to sulphides would require the presence of organic matter in much larger proportion than is generally found in mineral springs.

The precious metals occur in such small proportions, as compared with the baser ones, that it is not likely they exercised any material influence on the chemical changes then going on. Most of the rocks in the vicinity of the Summit District are found to contain a trace of gold, which may be inclosed in pyrite, as this mineral is frequently met with, especially in andesite. It is therefore possible that gold may have been segregated from the underlying rock. The silver was probably derived from the same source as the enargite with which it is associated, namely, that from which nearly all the ores of Southern Colorado are derived, the older Tertiary eruptives.

OXIDATION AND IMPOVERISHMENT OF SURFACE ORE AND CONCENTRATION OF GOLD IN BONANZAS.

To this important subject Mr. Hills devotes considerable space, his principal result being that the gold has been concentrated by waters containing salts of iron in the central channels of the deposits, as oxidation and erosion progressed. The connection existing between gold and hydrous oxide of iron, by no means rare in gold deposits, is particularly intimate in the Summit bonanzas. In all probability, pyrite was originally disseminated through the entire mass of quartz, and sulphate of iron, and finally limonite, resulted from its oxidation. Gold is slightly soluble in ferrous sulphate, still more so in ferric sulphate, both of which salts might have been formed during oxidation of the pyrite. Limonite is very abundant along the circulating channel, near the center of the Little Annie and Little Ida bonanzas.

The concentration of silver seems to have taken place at greater depth than that of gold, and the conditions of this concentration are as yet too little known to form a satisfactory conclusion with regard to it.

Summary.—The sequence of changes which produced the existing deposits may be briefly summarized as follows:

1st. The silicification of granular rhyolite by a solution containing free sulphuric acid, and the deposition of the metallic sulphides with gold and silver.

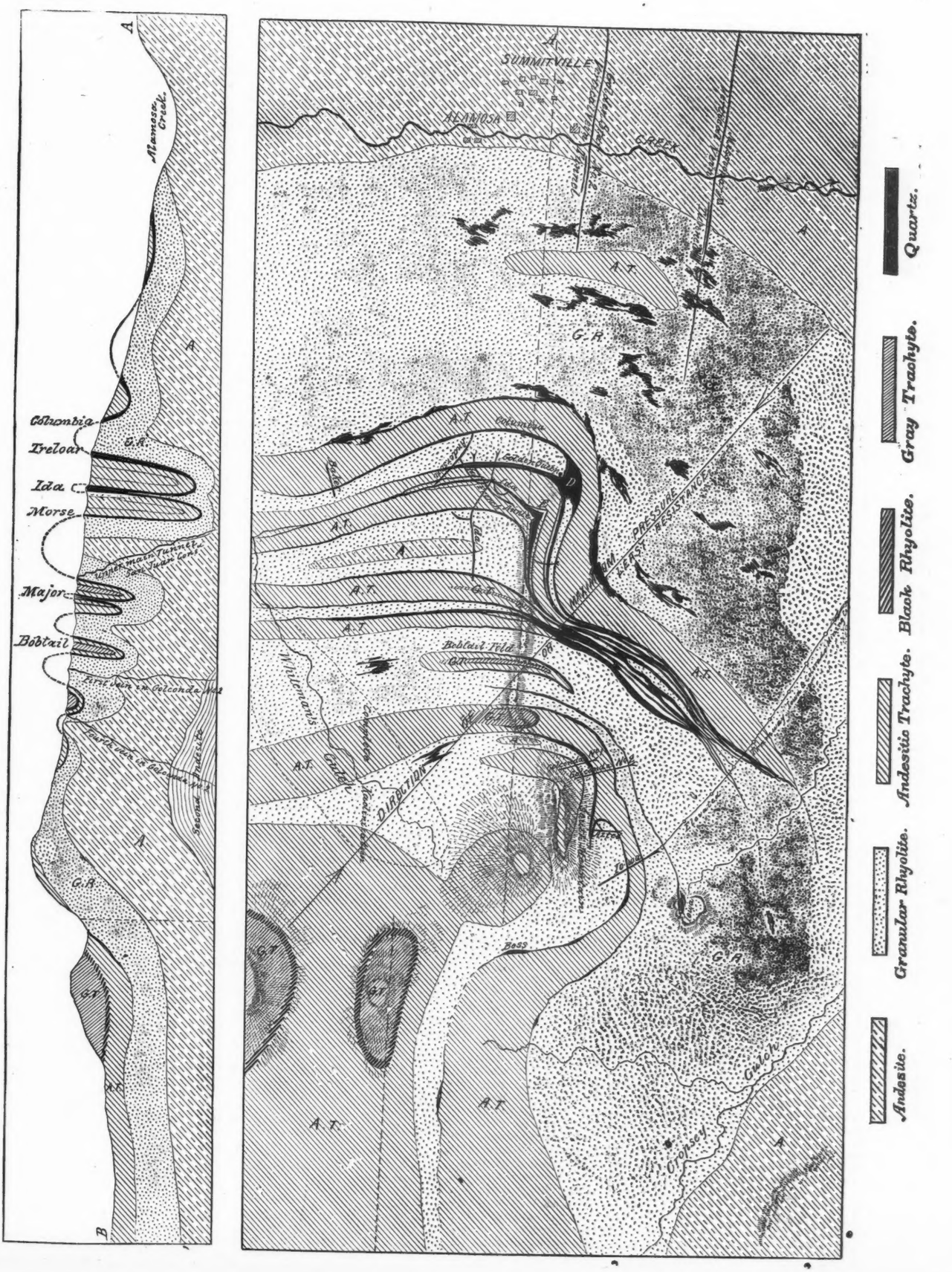
2d. Folding of the strata or beds.

3d. The oxidation and impoverishment of the surface ore, and the concentration of the precious metals in bonanzas.

In conclusion, Mr. Hills says:

"In the preceding remarks on the genesis of these deposits, it may appear that some of the conclusions are based upon insufficient evidence; but the anomalous features presented certainly demand something more than a mere statement of observed facts. For that reason, I have ven-

* Abstract of a paper read at the March meeting of the Colorado Scientific Society at Denver.


Quartz.
Gray Trachyte.
Black Rhyolite.
Andesitic Trachyte.
Granular Rhyolite.
Andesite.
SUMMITVILLE
ALAMOSA
Columbia
Treloar
Ida
Morse
Major
Bobtail
Bobtail Fold
DIRECTION
Gulch
A
A.T.
G.R.
G.T.
B

tured to put forward my own views in this particular case; and although they may be only approximately correct, they are such as seem to me the most plausible under the circumstances."

Although I have not yet visited the Summit District, and can therefore give no personal confirmation of the correctness of Mr. Hills's observations, embodied in the paper of which I have made the above brief abstract, I have reason to believe that he is a correct and trustworthy observer. Moreover, his views with regard to the processes of ore deposition, as shown therein, are in direct confirmation of those which I have held during the past few years with regard to an increasingly large class of ore-deposits. My report on Leadville shows, I think, conclusively, that ore-deposits there are the direct replacement of the dolomite rock in which they occur. While I have not yet had opportunity for studying with the same amount of detail other ore-deposits in crystalline and eruptive rocks, as shown in my chapter in the Census Report on the Precious Metals, now in press, I consider it reasonably certain that a very large proportion of the so-called fissure-veins in the Rocky Mountain region, notably those in Colorado and Montana, are simply the alteration, silicification, and mineralization of the country-rock along certain planes, which, for some reason or other, offered exceptionally easy access to percolating mineral solutions, and are not the filling-in of pre-existing cavities in the rock, as is generally supposed to be the characteristic of a true fissure-vein.

THE WORK OF THE PERNOT FURNACES AT CAMBRIA.

Mr. Magnus Troilius reports to the *Jern Kontorets Annaler* on the result of a number of runs in the Pernot furnaces at the works of the Cambria Company, at Johnstown, Pa., as follows:

Heat No. 1452; Furnace No. 2. October 22d, 1881. Side-walls, bottom, and roof had previously stood 12 heats. Time of heat, 3 hours 59 minutes. Charge: 10,000 pounds pig, 500 tons old rolls, 5000 pounds English rail crop ends, 10,000 pounds open-hearth scrap, 2000 pounds steel rail rolling-mill scrap, 6000 pounds converting mill scrap, and 500 pounds miscellaneous scrap—a total of 34,000 pounds. Furnace charged at 12.43 P.M.; charge melted, 4 o'clock; 100 pounds ore added at 4.35; 300 pounds pig added at 4.40; and 530 pounds 60 per cent ferro-manganese added at 4.43 P.M. Furnace tapped at 4.48, giving six ingots, weighing 32,450 pounds from a charge of 34,930 pounds.

Heat No. 1744; Furnace No. 2. January 4th, 1882. Side-walls and bottom had stood 7 heats and the roof 93 heats. Time of heat, 3 hours 50 minutes. The charge consisted of 7000 pounds of No. 4 pig, 3000 pounds old molds, 2000 pounds rolling-mill scrap, 15,000 pounds Scranton crop ends, 3000 pounds open-hearth scrap, and 500 pounds miscellaneous scrap—a total of 30.500 pounds. At 1 P.M., a part of the charge was in, and melting began; at 4.10 the remainder was charged, 3000 pounds being pre-heated; and at 4.20, the whole charge was melted. At 4.40, 500 pounds of No. 4 pig were added; and at 4.45, 375 pounds of 70 per cent ferro-manganese, making the total charge 31,375 pounds. At 4.50, five ingots, weighing 27,970 pounds, were tapped.

The bottom of the hearth at Cambria is made of equal parts of white sand from Mill Creek, Pa., containing 97·83 per cent of silica, 1·02 per cent of alumina, 0·83 per cent of protoxide of iron, 0·32 per cent of lime, and a trace of magnesia and of red sand from Columbia, Pa., containing 89·14 per cent of silica, 8·91 per cent, of alumina, 1·01 per cent of protoxide of iron, and 0·51 per cent of lime.

THE IRON ORES OF THE VALLEY OF VIRGINIA.*

By Andrew S. McCreath, Harrisburg, Pa.

Having recently been called upon by the Shenandoah Valley and Norfolk & Western railroad companies to make an examination of the iron ores in the Valley of Virginia tributary to their lines of railroad, it has been suggested to me that a brief statement in regard to some of the more important points might prove interesting to my fellow-members of the Institute at this meeting.

The Valley of Virginia, so-called, extends from the Potomac to the Tennessee line, a distance of about 330 miles. It forms part of the Great Limestone Valley which traverses in an unbroken line the States of New York, New Jersey, Pennsylvania, Maryland, Virginia, and Tennessee. In New York State, it is called the Wallkill Valley; in Eastern Pennsylvania, the Kittatinny Valley; in Middle Pennsylvania, the Lebanon or Cumberland Valley; in Virginia, the Shenandoah or Winchester Valley, the Roanoke Valley, the James River Valley, and the New River Valley; and farther south, the Valley of East Tennessee.

Two ranges of mountains hem the valley in. The range on the south-east is called the South Mountains in Pennsylvania; the Blue Ridge, with its southwest prolongations, Poplar Camp and Iron Mountain, in Virginia; and the Smoky Mountains in Tennessee. The range on the northwest is usually called the North Mountain; but it has such local names as Shawangunk, Kittatinny, Blue and Brushy Mountain.

The primary rocks consisting of granitic strata (gneiss) and crystalline slates (mica slate, chlorite slate, etc.) form the Eastern Blue Ridge, while the Primal or Potsdam sandstone formation lies upon its western slope along the southeast edge of the valley. The valley itself varies in width from ten to twenty miles, and its floor is composed of two different kinds of rock, limestone and slate, separated from each other by an irregular line running along the middle of the valley its whole length, the limestone land stretching to the foot of the South Mountain, and the slate land stretching to the foot and up the slope of the North Mountain. The North Mountain consists of Upper Silurian rocks—Oneida conglomerate and Medina sandstone, Formation No. IV.; except in Southern Virginia, where, by reason of the great upthrow faults, the Vespertine or Pocono sandstone, Formation No. X., makes the North or Brushy Mountain. It will be sufficient, however, for my present purpose, to consider only the two great geological formations: No. I., the Primal or Potsdam sandstone formation; and No. II., the Lower Silurian limestone formation; for it is in these that nearly all of the ores which I have examined occur.

Formation No. I.—The Primal or Potsdam sandstone formation consists of conglomerates, sandstones and slates, and it may be conveniently divided into (1) lower slates, (2) sandstones, and (3) upper slates.

First. In the *lower slates*, or those geologically underneath the Potsdam sandstone, occurs a red hematite ore, sometimes in beds of considerable thickness and of good quality. This is the so-called "specular ore" of the Blue Ridge, and it has been quite extensively developed at numerous points, notably in Botetourt and Bedford counties. In Northern Virginia, the ore is generally very lean, being little better than a ferruginous sandstone. But over large areas it is a fairly rich ore carrying from 40 to 45 per cent metallic iron, with the phosphorus varying from 0·25 to 0·60 per cent. The siliceous matter varies from 25 to 35 per cent, and consists for the most part of small grains of quartz. The ore occurs in beds varying from 18 to 40 inches in thickness, although beds of much greater thickness have been reported. The following is a complete analysis of a sample of this ore from the "Pollard cut" on the Arcadia furnace property, in Botetourt County:

Protoxide of iron	1·221	Sulphuric acid	·007
Sesquioxide of iron	55·928	Phosphoric acid	·607
Sesquioxide of manganese	·043	Water	3·144
Alumina	1·808	Siliceous matter	35·690
Lime	·730		99·884
Magnesia	·706		
Metallic iron	40·100	Phosphorus	·265
Metallic manganese	·030	Phosphorus in 100 parts iron	·660
Sulphur	·003		

Second. In the *Potsdam sandstone* itself, important beds of iron ore have been observed. The ore is generally a close-grained, brittle, dark-brown hematite, invariably cold-short. In Rockbridge County, a bed of it fully ten feet thick is exposed for a considerable distance on the Vesuvius property. The ores from this horizon will probably average 50 per cent metallic iron, with about one and a quarter per cent phosphorus. Their composition is such that they are peculiarly adapted to the manufacture of pig-iron for conversion into steel by the basic process; as it has been found that a pig-iron with about two and one half per cent phosphorus gives the most satisfactory results. The following complete analysis of a sample from the "cold-short" bank on the Vesuvius property, Rockbridge County, will show the ultimate composition of the ores of this horizon:

Sesquioxide of iron	74·893	Sulphuric acid	·012
Sesquioxide of manganese	·433	Phosphoric acid	3·357
Sesquioxide of cobalt	·030	Water	11·318
Oxide of zinc	None.	Siliceous matter	8·050
Alumina	1·005		100·198
Lime	·740		
Magnesia	·360		
Metallic iron	52·425	Phosphorus	1·466
Metallic manganese	·302	Phosphorus in 100 parts iron	2·796
Sulphur	·005		

Third. The *upper slates*, however, are by far the most important from an economical stand-point, forming, as they do, one of the richest repositories of brown hematite iron ore in Virginia. They intervene between the Potsdam sandstone and the base of the Calciferous limestone, and they are found all along the western slope of the Blue Ridge, being geologically coextensive with it. They are generally more or less disintegrated or decomposed into variegated clays; and while they may not always carry a continuous ore-bed, yet wherever the formation exists, deposits of iron ore of greater or less extent may be confidently looked for. It is this horizon which has supplied a large amount of iron ore to the blast-furnaces of Pennsylvania, and it has been the source of practically the whole of the stock of the old charcoal furnaces of the Shenandoah Valley: to the Shenandoah Iron Company's furnaces, from the noted Smith and Fox Mountain ore-banks in Page and Rockingham counties; the old Mount Torry furnace in Augusta; Cotopaxi, Buena Vista, Vesuvius, and Glenwood furnaces in Rockbridge, and the Arcadia and Cloverdale furnaces in Botetourt County. The new modern coke-furnace recently established at Roanoke by the Crozer Steel and Iron Company will also be largely supplied with ores found in this formation at the company's mines in the so-called Cloverdale ore-belt.

It would be tedious to mention all the localities where large deposits have been developed and are now successfully worked; and the increased railroad facilities afforded by the completion of the Shenandoah Valley Railroad will doubtless be the means of greatly stimulating their further development by more thorough and systematic methods of mining.

The average character of the ore is good, and in some localities it is exceptionally fine. The average of 31 carefully selected samples shows the following: Metallic iron, 49·956; phosphorus, 0·399; siliceous matter, 12·459. The iron varies from 38·95 to 56·55 per cent. and the phosphorus from ·061 to 1·266 per cent. Eighteen of the samples show considerably over 50 per cent metallic iron, and only one sample shows less than 40 per cent.

The following complete analyses will represent the character of some of the more important deposits. The samples represent the *lump ore* alone; and the ores were dried at 212° Fahr. previous to analysis:

	No. 1.	No. 2.	No. 3.	No. 4.
Sesquioxide of iron	74·678	75·321	77·643	74·571
Sesquioxide of manganese	4·619	1·831	·568	2·038
Sesquioxide of cobalt	·080	·130	·020	None.
Oxide of zinc	·040	·050	Trace.	None.
Alumina	1·415	2·100	·747	·951
Baryta	None.	None.	None.	·040
Lime	·670	·550	·430	·550
Magnesia	·320	·331	·324	·356
Sulphuric acid	·052	·025	·040	·040
Phosphoric acid	·233	·609	·446	·444
Water	11·810	12·398	10·310	10·822
Siliceous matter	6·310	6·910	9·390	10·450
	100·227	100·255	99·918	100·262
Metallic iron	52·275	52·725	54·350	52·200
Metallic manganese	3·216	1·275	·396	1·419
Sulphur	·021	·010	·016	·016
Phosphorus	·102	·266	·195	·194
Phosphorus in 100 parts iron	·195	·504	·358	·371

No 1. Donovan property, Beverly Ore Company, Page County. No. 2. Fox Mountain bank, Shenandoah Iron Company, Rockingham County. No 3. Buena Vista furnace property, Rockbridge County. No. 6. Houston mines, Nos. 5 and 6 openings, Botetourt County.

It has been part of my duties as chemist for the Second Geological Sur-

* A paper read at the Roanoke Meeting of the American Institute of Mining Engineers.

vey of Pennsylvania to sample and analyze every important deposit of brown hematite ore that has been opened up along the flank of the South Mountains in Pennsylvania, which is simply a continuation northward of this same ore-belt. The average of 46 samples from the Cumberland Valley shows: Metallic iron, 42·95; phosphorus, ·464 per cent; and it is believed that the brown hematite ores at present mined in the Lehigh Valley will not average over 40 per cent metallic iron in the furnace. It will thus be seen that the ores from this horizon in the Valley of Virginia rank considerably above the average.

In these upper slates are also found important deposits of manganiferous iron ores, some of which might be used in the manufacture of spiegel. The average of six samples analyzed shows: Metallic iron, 31·64; metallic manganese, 19·12, equal to 50·76 total metallic contents; with the phosphorus averaging ·130 per cent. The variations are as follows: Iron, from 12·325 to 47·15; manganese, from 7·277 to 44·312; and phosphorus, from ·061 to ·265 per cent, with the average as stated above.

In addition to these, rich deposits of a very pure manganese ore have been successfully worked for a number of years. Thus far, the most important is that at the Grimora mines in Augusta County; and the deposit seems so large, and the ore is of such fine quality, that I give in detail the analysis of an average sample of the *lump ore*, now quite extensively shipped to England:

Binoxide of manganese	81·703	Lime	·880
Protoxide of manganese	7·281	Magnesia	·630
Sesquioxide of iron	·533	Sulphuric acid	None.
Oxide of cobalt	·354	Phosphoric acid	·171
Oxide of nickel	·096	Alkalies	·467
Oxide of zinc	·623	Water	3·405
Oxide of copper	None.	Silica	2·132
Alumina	·896		100·000
Baryta	·829		
Metallic manganese	57·291	Phosphorus	·075
Metallic iron	·373		

Formation No. II.—In the body of the Great Limestone Formation, No. II., are found innumerable caverns and pot-holes, now filled with brown hematite iron ore. Although such deposits may prove somewhat irregular, yet their extent is often very great, and they have yielded large quantities of the finest quality of ore. In the northern part of the Valley of Virginia, these limestone ores have not been developed to any great extent; but in Southwest Virginia, they have furnished practically the whole of the stock to the charcoal furnaces of the district. Commencing at Mack's Creek near New River, and pursuing a course parallel to Poplar Creek and Iron Mountains for a distance of thirty or forty miles, they have been developed in large quantity and of remarkable purity. This is generally known as the New River-Cripple Creek Ore-Belt; and the cold-blast charcoal furnaces of Wythe County, whose iron is in good repute for car-wheel purposes, draw their supply of ore exclusively from this belt.

The ore occurs generally mixed with clay in clefts and cavities in the limestones; and some of the deposits have been proved to a depth of over one hundred feet. The bulk of the ore is wash-ore, and the wash material will average fully one half clean ore. At some points, however, the workings show quite a good deal of lump ore; and this not infrequently carries an appreciable amount of iron pyrites, which occurrence may be suggestive of the origin of the ore. The superior quality of the ore is shown by the analyses of seventeen samples from different localities, yielding an average of: Metallic iron, 54·514; phosphorus, 0·106; siliceous matter, 7·094 per cent. The iron varies from 49·35 to 57·20; the phosphorus from ·048 to ·197; and the siliceous matter from 3·60 to 13·93. Nine of the samples show over 55 per cent metallic iron, and only one contains less than 50 per cent; and in no case is the phosphorus over ·200. The general character of these limestone ores may be represented by the following complete analyses:

	No. 1.	No. 2.	No. 3.
Bisulphide of iron	None.	·04	None.
Protoxide of iron	None.	·047	None.
Sesquioxide of iron	76·214	80·618	73·167
Sesquioxide of manganese	·051	·103	1·334
Oxides of nickel and cobalt	·040	·060	·110
Oxide of zinc	None.	·150	·220
Oxide of lead	None.	·184	None.
Oxide of copper	None.	Trace.	None.
Alumina	2·365	1·476	1·410
Lime	·820	·750	·710
Magnesia	·486	·515	·677
Sulphuric acid	·157	·092	·012
Phosphoric acid	1·1	·110	·451
Water	12·072	11·174	10·576
Siliceous matter	7·480	4·500	11·510
	99·856	99·843	100·117
Metallic iron	53·350	56·500	51·175
Metallic manganese	·036	·072	·929
Sulphur	·063	·071	·005
Phosphorus	·075	·048	·197
Phosphorus in 100 parts iron	·140	·085	·384

No. 1. Rich Hill, or Forney property, near New River. No. 2. New River Mineral Company's property (Van Liew's). No. 3. Speedwell Furnace property.

In addition to the ores already mentioned, I desire to call attention to another remarkable group of ores occurring in the Great Limestone Formation, and found at several points in Southwest Virginia and Eastern Tennessee, namely, red hematite and magnetic iron ores. These may be said to be as yet practically undeveloped; for the ores were found to be too refractory for the small cold-blast charcoal furnaces of the district, and the lack of railroad facilities prevented their finding an outside market.

Sometimes the ore is a dense, fine-grained red hematite, with a steel-blue color on fresh fracture, as at the Sharp, Thomas, and Crockett banks in Sullivan County, Tennessee; again, it is a fine, rich magnetic ore, as shown at the Ripplemead mine on New River, near Pearisburg, Giles County, Va., from which about 5000 tons have recently been mined and shipped to Harrisburg, Pittsburg, and other points. Sometimes the ore changes into brown hematite; and indeed, all three varieties may occasionally be found in the same opening. But whether the ore be red or brown hematite, or magnetite, it seems to possess the uniform feature of being very free from phosphorus. An exception might perhaps be sometimes made to the magnetite. At some points, this has been found to be more or less impregnated with slaty material, and when this is the case, the phosphorus may run somewhat higher; for I have observed that quite an appreciable amount of phosphorus is sometimes carried in the slate. But when the ore is free from this slaty gangue, the percentage of phosphorus is invariably low; and even where the ore carries considerable slate, the phosphorus has never been found over one tenth of one per cent. It may prove interesting to note here that the magnetite is generally strongly impregnated with carbonaceous matter, sometimes to the extent of two or three per cent.

At the Sharp and Thomas banks, in Sullivan County, Tennessee, the ore (red hematite) is reported from 5 to 10 feet thick, between walls of limestone; but owing to the difficulty of reducing these hard, dense ores in the small local furnaces, the openings have long been abandoned. Increased railroad facilities and the present demand for high-grade ores will doubtless be the means of having these deposits receive the attention which the fine quality of their ore seems to justify. The analyses of nine samples of the red hematite and magnetic ores yield the following average: Metallic iron, 62·094; phosphorus, ·032; siliceous matter, 5·290. The iron varies from 56·05 to 66·47; the phosphorus, from ·020 to ·051; and the siliceous matter, from 2·39 to 7·90. Separate analyses of four samples of the accompanying brown hematite show an average of: Metallic iron, 54·532; and phosphorus, ·031.

The following complete analyses will show the general character of these ores:

	No. 1.	No. 2.
Protoxide of iron	12·117	1·928
Sesquioxide of iron	66·607	90·214
Sesquioxide of manganese	None.	None.
Alumina	2·197	1·863
Lime	1·890	·500
Magnesia	1·982	·317
Sulphuric acid	·150	·020
Phosphoric acid	·082	·050
Carbonic acid	1·806	None.
Water and carbonaceous matter	5·458	1·834
Siliceous matter	7·760	2·975
	100·049	99·701
Metallic iron	56·050	64·650
Metallic manganese	None.	None.
Sulphur	·060	·008
Phosphorus	·036	·022
Phosphorus in 100 parts iron	·064	·034

No. 1. Golleher bank, Washington County, Virginia. Magnetic iron ore. No. 2. Crockett bank, Sullivan County, Tennessee. Red hematite.

In view of the fact that the iron ores of the Valley of Virginia are of such superior quality, and there is sufficient evidence that they exist in large quantity, it may well be asked, Why have they not been more largely developed? Two reasons may be given, and these are: 1. Previous lack of railroad facilities; and 2, an insufficient supply of fuel for reducing the ores in the blast-furnace. Although ever since early colonial times, numerous small charcoal furnaces have been operated from time to time, producing a fine quality of pig metal, yet the lack of facilities for getting their product to market, and the gradual diminution of their fuel supply, together with the ravages caused by the late war, have not only greatly retarded their extension, but have prevented the establishment of other enterprises. These obstacles, however, have now been overcome by the completion of the Shenandoah Valley Railroad from Hagerstown to Roanoke, thus affording ample railroad facilities; and by the building of the New River division of the Norfolk & Western Railroad to open up the great Flat Top coal region, with its superior coking coals. The New River-Cripple Creek ore-belt will soon be supplied with convenient railroad communication; for a branch road has already been located, and there are good prospects that the line will be built in the near future.

During the present year, the two pioneer *coke* furnaces of the valley have been started, and are now in successful operation. The Shenandoah Iron Company's furnace at Milnes Station on the Shenandoah Valley Railroad was blown in during the month of February, and it has been producing from 60 to 70 tons of coke iron per day ever since. The Crozer Steel and Iron Company's furnace at Roanoke has just been started, and it promises a successful future; for it has all the modern and improved appliances, combined with an intelligent management. Both of these furnaces will draw their supply of coke (made from Flat Top coal) from the ovens of the Southwest Virginia Improvement Company at Pocahontas. This company commenced operations in February, 1882, by opening up the Nelson or Big bed of coal. It is now building 200 bee-hive coke-ovens, and it expects to have a daily production of at least 250 tons of 48-hour coke, which output can readily be increased to meet future demands. In addition to this, it will ship a thousand tons of coal daily. Already in its preparations for regular mining, it has taken out from the various drifts some 40,000 tons of coal. The main drifts are 9 feet wide and 8½ feet high, and the mine will be worked by the double-entry system of mining. The quality of the coal is very fine, as shown by the following analysis of samples selected from five different points in the drifts—the samples representing a complete section of the coal-bed from roof to floor.

Water	·932	Sulphur	·618
Volatile matter	20·738	Ash	3·984
Fixed carbon	73·728		100·000
Phosphorus			·0013

This brief statement will suffice to show, in a general way, the mineral resources of the valley. With a convenient supply of the finest quality of coke, which the Flat Top coal promises to furnish; with a great variety and abundance of excellent iron ore, which can be cheaply mined; and with good railroad facilities to markets in every direction, the iron interests of the Valley of Virginia seem assured of a prosperous future.

MR. W. W. HABIRSHAW, chemist, of this city, reports the following as the analysis of the steel made in the Henderson furnace, referred to in a recent issue: Carbon, 0·0014 per cent, and phosphorus 0·1528 per cent. It will be noted that the carbon is exceptionally low, 0·2 having been aimed at, a proof of the unexpectedly great oxidizing character of the flame.

THE SPELTER PRODUCTION OF EUROPE.

In our last issue, we printed an estimate of the spelter production of Europe for 1881, by an Austrian statistician. The following is a statement for 1882, compiled by Herr Landsberg of the Stolberg Works, Germany:

	1882.
Rhenish Provinces and Westphalia	45,354 metric tons.
Silesia	69,846 "
Belgium and France	91,800 "
Spain	4,500 "
England	25,000 "
Austria	4,000 "
Poland	4,500 "
Total	245,000 "

These figures are evidently erroneous in some points. Belgium and France together are probably nearer 100,000 tons, and Spain produces now at the rate of fully 7000 tons per annum, while the English figure looks excessively high.

THE LEAD PRODUCTION OF GERMANY IN 1882.

Herr Landsberg, the able manager of the Stolberg Works, has published the following detailed production of the German lead works:

	Lead. Metric tons.		*Silver.* Kilograms.	
Prussia:	1882.	1881.	1882.	1881.
Stolberg Company	14,919	13,996	26,130	20,227
Rheinisch Nassau Company	6,239	7,200	7,608	6,212
Mechernich Company	25,055	22,409	5,108	4,438
Commern Company	2,727	2,362	988	1,181
A. Poensgen & Söhne	3,100	3,189	1,175	1,382
Rothenbach Works	40	55	901	969
Walther Cronek Works	5,858	5,489	3,679	4,056
Friedrichs Works	8,683	8,450	5,245	5,532
Mansfeld Works	.....	.....	62,708	59,836
Hanover:				
Upper Hartz	10,447	9,428	32,592	26,385
Lower Hartz	579	424	3,375	3,854
Nassau:				
Ems	5,803	5,772	7,403	6,887
Braubach	3,176	2,721	6,085	5,515
Saxony:				
Freiberg	5,064	4,494	50,985	39,133
Total	91,690	85,989	213,982	185,607

In addition to this, the German works produced 4170 tons of litharge in 1882, against 4227 tons in 1881.

A NEW NOTE-BOOK.—Messrs. Keuffel & Esser, of this city, have published a new Transit Book for the Use of Engineer on Railroad Surveys. Its novelty consists in having printed on the last three leaves all the tables and curve formulæ necessary for the location of a railroad. By the use of these note-books, the necessity for carrying an engineer's field-book of tables is avoided. The cost is not materially increased, and they will be found very convenient.

EXPERIMENTS made in the Saarbrücken coal district with the lime process seem to indicate that the action of slacking compressed caustic lime with water is chiefly by means of the expansion of the lime cartridge. The breaking down of the coal seems to depend very little upon the generation of steam of high pressure. The ordinary explosive test in lead cylinders showed that the lime has only to a limited degree the attributes of an explosive.

SILVER PRODUCTION OF BOLIVIA.—A Lima letter in the New York *Herald* gives Bolivian statistics which are very difficult of access. If they be correct, they are doubly acceptable. They are certainly new, although they cover the year 1881 only, when the exports from Bolivia are said to have been as follows:

Silver from Oruro, Potosi, and Chinchas, 71,101 kilos	$3,086,000
" " Huanchaca and Guadalupe, 85,935 kilos	5,811,130
Copper from Corocoro, 3,250,000 kilos	420,000
Tin	458,000
Argentiferous lead	6,968
Bismuth	61,819

ELECTROLYTIC EXPERIMENTS.—In the *Journal* of the Chemical Society for May is an abstract of a paper by A. Bartoli and G. Papasogli, on the results of the electrolysis of various solutions. From the experiments they have made, the authors draw the following general conclusions: 1. In liquids whose electrolysis is not accompanied by evolution of oxygen at the anode, wood charcoal, retort-carbon, and graphite are not disintegrated, and do not suffer any appreciable loss of weight. 2. On the contrary, in liquids whose electrolysis gives rise to liberation of oxygen at the anode, wood charcoal, retort-carbon, and graphite, employed as positive electrodes, are partly disintegrated and partly oxidized to carbonic oxide and carbonic acid (the relative quantities of which depend upon the strength of the current and the superficial area of the positive carbon), together with other products varying according to the nature of the carbon. 3. Graphite used as positive electrode in these liquids never colors the electrolyte, whereas retort-carbon and charcoal previously purified by the action of chlorine at a high temperature color the liquid deep black, both in alkaline solutions and in those of certain acids and their salts. 4. Charcoal or retort-carbon employed as positive electrode in solutions of acids or of neutral salts whose electrolysis gives rise to evolution of oxygen at that electrode forms chiefly, or rather almost entirely (beside carbonic oxide and carbonic acid), a black substance—called by the authors mellogen—whose composition is represented by the formula $C_{14}H_2O$, or a multiple thereof, together with mere traces of benzo-carboxylic acids; while in solutions of phosphoric acid, hydrofluoric and potassium antimonate, a substance is formed analogous to mellogen in its properties, but containing phosphorus, fluorine, or antimony, according to the electrolyte employed.

FURNACE, MILL, AND FACTORY.

Ex-Commander Gorringe, in the ships he is building at Philadelphia, is going to use the Bower-Barff process for protecting those parts of iron and steel which are inaccessible after the ship is completed.

A. Garrison & Co., of Pittsburg, have just sent a train of three-high plate rolls 31 by 112 inches to the Springfield iron mill. They are building rolls for the Maumee Rolling-Mill Company, Toledo, Ohio.

The Spang Steel and Iron Company, of Pittsburg, is rolling its universal mill steel plates 40 feet long and somewhat under 8 feet wide. It can roll plates 9 feet wide. It is also rolling a large quantity of angle steel, to be used in building the new bridge intended to span the Niagara River.

The Springfield Malleable Iron Company, of Springfield, Ohio, is increasing the capacity of its works fully 50 per cent. It is putting in one additional air-furnace, three annealing-ovens, and a molding-room 100 by 75 feet, which will give it a capacity of 3500 tons of iron a year. These improvements will be finished about June 15th, and then the company will employ 250 men.

The Bullard Repeating Arms Company intends to erect, either in Springfield or Worcester, Mass., a building 168 by 40 feet, and four stories high, with a tower at one end. This building will give facilities for working 200 men, the company having orders enough to employ that number, and leave a space for a 120-foot addition on the other side of the tower when the business shall require it. Nothing is settled yet as to location. Springfield capitalists are working hard to secure it. The company expects to have its buildings erected and ready for occupancy in September.

An Associated Press dispatch reports: The Grafton Iron Company, of Leetonia, Ohio, has failed. Its liabilities are about $600,000. Two large concerns in Pittsburg—Graff, Bennett & Co., iron manufacturers and furnace-men, and Robinson Rea—are stockholders in the Leetonia corporation. Their solvency is undoubted. All rumors to the contrary disregard the fact that their own indebtedness would have to be paid before any claims on the score of the Grafton Company could come upon them. Both firms are extensive, and have always been managed with the most conservative views. The Elba Iron-Works have also been mentioned as being in trouble, but a correspondent of the Associated Press is informed by an undoubted authority that there is no foundation for the report.

The wheels of a new locomotive which have just been built at Salt Lake City were cast from pig-iron made at the Ogden Iron-Works, and hence are strictly a Utah production. The frame-work of the engine was forged in those shops, and the locomotive represents Utah labor and skill, and partly Utah material.

The reverberatory gas-furnace, already successful in smelting iron and steel, has now, according to the *American Manufacturer*, proved equally so in the treatment of fine ores. An old style furnace in the plant of the Miners' Smelting and Reduction-Works at Golden, Colo., was recently remodeled into a McNair gas-furnace. Slack is used as effectively in it as lump coal. Pittsburgers are largely interested in this experiment, as among the stockholders in the Miners' Smelting and Reduction-Works at Golden are Messrs. R. B. Townsend, the secretary and treasurer; W. W. Young, E. T. Dravo, Matthew Graff, John Graff, Thomas J. Graff, B. L. H. Dabbs, and W. B. Neale.

The Missouri Malleable Iron Company, of St. Louis, has decided to increase its capital stock from $50,000 to $100,000. It will also gradually increase the capacity of its already extensive works.

E. G. Denniston, proprietor of the San Francisco Plating-Works, has achieved a notable feat in his line, in the manufacture of the largest silver-plated amalgamating plates, for saving gold, ever made. These plates are five by eight feet—each containing forty square feet of amalgamating surface. These plates have been shipped to Denver, Colorado, where they are to be used for amalgamating purposes. They are made of the best Lake Superior copper heavily plated on one side with pure silver, and are ready for instantaneous amalgamation by the application of quicksilver to the plated surface. The dynamo machine has a capacity of depositing fifty-five ounces of silver per hour. It is from the Mather Dynamo-Electrical Manufacturing Company, of Hartford, Conn. Mr. Denniston claims to have, at his works, the largest tank for electro-plating purposes in the United States, if not in the world. Extensive additions and improvements are making in his works.

Judge Treat, in the United States Circuit Court, at St. Louis, has recently rendered a decision of great importance to nearly every part of the United States, settling the great barbed wire fence controversy. The court holds that the patents issued to Kelly & Glidden are void, and therefore refused to grant the preliminary injunction asked for by the Washburn & Moen Manufacturing Company and Isaac L. Ellwood. The Washburn Company likewise sought an injunction against Gustave Griesche and Henry Fuchs relative to the manufacture of patent machines for barbed wire. This injunction was refused, on the ground that there was no infringement. The earliest barbed wire patent was issued in 1867 to one Hunt, since which time the issues and reissues have been almost innumerable. All of these, or at least all of them that possessed practical business features, have been from time to time acquired by the Washburn & Moen Manufacturing Company of Worcester, Mass., and Isaac L. Elwood of De Kalb, Ill., the plaintiffs in the cases referred to. Of all the numerous patents the only practical ones are those known as the Kelly & Glidden patents, the original issue of which has been claimed by the defendants in the suits, enlarged and amplified out of all knowledge by subsequent reissues. It is precisely here that the controversy took place and where the battle has been fought out. If the reissues had been declared to be within the meaning and intention of the original patents, or if they are, in other words, valid, the defendants would have been guilty of infringement. If otherwise, and the courts declared the reissues vitally at variance with the original patents and invalid, the business of manufacturing barbed wire would be thrown open without restriction.

GENERAL MINING NEWS.

ARIZONA.

Glowing reports coming from Turkey Creek state that important strikes have been made there. The whole country for a mile and a half on each side of the original discovery is monumented, and the excitement runs high. A new townsite has been located and incorporated, and in all probability a new town will come into existence within the next sixty days. The country for miles in every direction is permeated with ledges of high-grade ore.

COPPER MOUNTAIN.—This company's smelter, during the thirty-hour trial run, produced six tons of black copper, which were run into bars of from 600 to 700 pounds each. The mines consist of the Copper Mountain and the first south extension of Copper Mountain. Both of these claims are constantly worked. Thirty-two hundred tons of ore are on the dump, consisting mostly of carbonates, red and black oxides, and some black and gray copper.

TOMBSTONE DISTRICT.

TOMBSTONE MILL AND MINING COMPANY.—The superintendent telegraphs as follows: Gross output for May: Mill, $53,600; furnace, $23,000 for twenty-one days. Furnace runs without any trouble and works forty tons daily. The

mine looks well. We have begun fourth level, west side; new ore-body in Tough Nut yielding well.

CALIFORNIA.

MONO COUNTY—BODIE DISTRICT.

BODIE CONSOLIDATED.—The official report for the week ended May 26th shows: Ore crushed, 172·08 tons; average assay value of pulp, $45.45 per ton; of tailings, $6.50 per ton. Bullion shipped, $5182.02. West cross-cut, 1000 level, is in 240 feet. North drift, same level, is in 160 feet. North drift, 800 level, is 490 feet long. Winze No. 5 is 28 feet deep; the rock continues hard and the vein narrow. From near the end of the north drift from winze No. 5, 672 level, a rise was started last week; rise now up 10 feet. It will be known as rise No. 23, and will probably open up a block of fine ore to the 640 level and north of winze No. 6. South drift from winze No. 5 is 166 feet long, and shows some good ore in the face.

BODIE TUNNEL.—The ore formation is again looking favorable in all the workings of the mine. Lately 16 feet were added to the length of the west cross-cut from the 200-foot level. The north drift on ledge No. 21 has been advanced 7 feet. The north drift on the east ledge has been advanced 12 feet in ore 3 feet in width. The south drift on ledge 21, 300-foot level, has been advanced 3 feet. The ore is 2½ feet wide. The mill is crushing about 40 tons a day.

GREENVILLE DISTRICT.

PLUMAS CONSOLIDATED.—A vein of ore about four feet wide has been struck in a prospect-tunnel. The ore is of fair quality, the ledge appears to be well defined, and stands nearly vertical. It is thought that this vein is only a stringer, and will soon run into a much larger ore-body.

WILES.—The parties interested in this ledge, which shows favorable prospects, intend to lease the Kettle mill and proceed at once to work the mine. The distance from the mine to the mill is only a few hundred yards. The ore can be got and worked very cheaply.

CANADA.

PROVINCE OF NOVA SCOTIA.

GALLIHAR GOLD MINING COMPANY.—It is stated that the company is so much encouraged by the results of the operations at its mine at Isaac's Harbor, Guysborough County, that it proposes extending its works.

ONTARIO.

WALLBRIDGE.—Pumping machinery has been erected at this mine and work will be commenced shortly.

WINNIPEG.

The Argyle has struck rock that will go $69 to the ton.

The depth attained by the Winnipeg Consolidated is ninety-five feet, with four drifts.

William Young left last Wednesday for the property of the International Company, which he is stripping and making ready for its inspection.

Mr. John T. Nagle, superintendent of the George Heenan Company, states that they are sinking on the vein, and that he considers the indications particularly favorable.

A location was surveyed lately by Messrs. Davidson & Smith, for Messrs. Simpson, Newell, and others of Keewatin. The vein is situated near that village, and, judging from specimens shown, is rich in the precious metal.

A portable stamp-mill was shipped on Saturday for Clearwater Bay by Messrs. Thomas & Co., for the purpose of working a location at that point, the property of the Mining Investment Company.

COLORADO.

CHAFFEE COUNTY.

CHAFFEE CITY.—The name of this town has been changed to "Monarch" by the Postmaster-General, to take effect after July 1st next. This was done in accordance with a petition numerously signed by the citizens. Indications point to active work in the mines of this locality this season, and good reports may be expected.

CLEAR CREEK COUNTY.

We glean the following from the Georgetown *Miner*:

BONANZA TUNNEL.—This enterprise is now in nearly 600 feet on the west side of Democrat Mountain. At a distance in of 330 feet, it cuts the Jordan lode about 120 feet deep. A drift has been run about 220 feet east on the Jordan, which produced, with some stoping, about $3000. A streak has been struck from three to ten inches thick of solid galena ore, carrying considerable gray copper and running about 500 ounces silver per ton. Eighty-five feet beyond the Jordan, a blind lode was struck, from two to three feet wide, with streaks of mineral through it, the average assays from which were 150 ounces. From this lode, the tunnel has been run 175 feet in barren ground.

DUMONT.—In the Lincoln tunnel, which is about 600 feet in, they struck the California lode at a depth of about 300 feet, which shows a foot of solid gray and yellow copper.

LITTLE EMMA.—The Matthews tunnel connected with the main shaft about April 1st, at a depth of 440 feet below the present working tunnel level, and about 640 feet below the summit of Democrat Mountain. The Matthews tunnel is 1250 feet long where it connects by an eighty-foot winze with the sixth level, which latter connects 200 feet farther east with the main shaft now down 360 feet below the working tunnel level. Seven men are working on a single-day shift, principally in the fifth level, which is now about 120 feet west of the main shaft. This will be continued eighty feet, so as to connect with the eighty-foot winze from the sixth level to the Matthews tunnel. This same connection will be made with all the levels, when rock and ore can all be shipped by gravity from 440 to 640 feet, thus saving an immense sum for hoisting. The Matthews tunnel is run all the way on the lode and cost an average of $6.50 per foot to run it.

MENDOTA.—Shipments from this mine for May were thirty-eight tons; average value, $60 per ton, making $2280. Beck & Co. have three cars ready for shipment, and Hennessy & Shay have ten tons. The Mendota tunnel is eighty-eight feet under cover in solid rock. The total length from the starting-point is 100 feet, all in solid rock, twelve feet having been in open cut, to secure a face.

TISHOMINGO.—In this Sherman Mountain property, a party of six has leased the shaft. It started sinking on a foot of lead ore that runs 60 ounces silver and 45 per cent lead.

VIRGINIA CITY.—The managers of this property have concluded to sink the new fifty-foot shaft from the tunnel level considerably deeper. They are accordingly raising the shaft to the surface, a distance of about sixty feet, intending to erect a whim and push the sinking as rapidly as possible.

GARFIELD COUNTY.

Dotsero is the name of a new metropolis that has recently sprung up. The town is located at the junction of the Eagle and Grand rivers.

HINSDALE COUNTY—RED MOUNTAIN DISTRICT.

In the immediate vicinity of this district are the following mines, many of them paying and all capable of shipping pay ore: The Congress, Silver Belle, Senate, Silver Ledge, Turquois, American Girl, Champion, Excelsior, Charter Oak, Treasure Trove, National Belle, Hudson, Enterprise, Galena Lion, Albia, Genesee, Yankee Girl, Orphan Boy, Guston, Robinson, Lily, Holiday, Prescott, Albany, Jed, H. A. W. Tabor, Bonanza King, John Wilson, and Tag End. These mines are all developing, and when the snow, which is quite deep, disappears, the activity will be remarkable. The Yankee Girl has two shafts. No. 1 is 30 feet deep, and is cut by a cross-cut, through which the ore is dumped. The shaft is continued. No. 2 is 90 feet deep, to which the cross-cut is also extended, and each shaft is in solid mineral, the body being from ten to fifteen feet across. Since November, this mine has shipped 1300 tons. The ore averages ninety ounces in silver and forty per cent lead, with a liberal per cent of copper, and the value increases with depth. The Orphan Boy, a parallel lode 150 feet west, owned by the same company, and a cross cut with levels, will connect them as developed. The Orphan Boy vein shows from four to six feet in width, and is widening.

LAKE COUNTY.

Late Leadville exchanges report the following:

CHRYSOLITE.—Since last October, the property has again been self-sustaining, and during the month of March of this year, the yield reached a figure sufficiently large to leave some profit. During April, the surplus returns amounted to about $12,000, and a few days ago Manager Clark made a transmission of money to the New York office, consisting of a draft for $15,000. During March, the mine sold to the smelters 832 tons of ore, netting $25,499; an average of $30.64 per ton. For April, the shipments from the mine were 696 tons, netting $24,555, or an average of $35.23 per ton. The shipments for thirty days in May show 965 tons, and the ore being of better grade than during the two previous months, the returns will exceed $30,000, and permit another remittance to New York. The present resources of the company's mines in ore in sight are limited; but the prospects of opening up new ore-bodies are worth something, while the old workings of the mine will continue producing for an indefinite period yet, but no great advance on the present production can be anticipated. The exploration-work of the mine is confined mostly to the incline starting on the third iron from the foot of the Colorado Chief No. 2 shaft. This body of iron ore occurs as an interstratified vein, and is situated near the center of a stratum of Silurian limestone seventy feet in thickness. The ore consists of oxide of iron and manganese, quite siliceous, and also containing some lime. The mineral presents a quite different appearance from the iron found in the upper workings of the Chrysolite, and it may be safely said that its character and composition are not very favorable to mineral of paying grade. Some ore has been obtained in pursuing this work, but it was found mostly filling vuggs in the iron, and showing no continuity. Occasionally scattered cubes of galena are also found in dark, hard iron, but it is seldom that seams of lead ore are encountered. The incline from the Colorado Chief shaft leaves the perpendicular shaft at 200 feet from the surface, and starts on an incline of 75 degrees from the horizon, toward the Roberts shaft, located 400 feet to the northeast. At 210 feet, the workings of the Sliver shaft are passed, some distance below the old developments about the Sliver. The incline then continues forty feet farther, where its face is now in worthless iron ore. At the point where the incline passes beneath the Sliver workings, a rise was made, showing the following formation: Third iron, 16 feet; parting quartzite, 12 feet; second iron, 10 to 14 inches; block porphyry, 62 feet. This carries the rise up to the old Sliver workings where the upper ore-body of the Chrysolite formerly existed. In addition to the prospect-work in progress from the Colorado Chief shaft, the manager is employing quite a force in exploring the territory of the company through its old workings, and also into new sections, particularly to the north and west, with varied results. A mill was recently erected, and all the waste and low-grade ore-dumps are carefully sampled with the view of ascertaining their silver contents and other features for guidance in the proposed erection of a concentrating mill. Up to the present time, the company has recovered from its old waste and low-grade ore-dumps 197,507 ounces of silver and 507 tons of lead, the result of jigs and hand-sorting, done on tribute.

CLIMAX.—It is reported that the lessee is meeting with unusual success in working the Montana shaft. A large force of miners is employed, and considerable high-grade ore is extracted.

COLORADO PRINCE.—The stamp-mill belonging to this company has been taken down in South Evans Gulch, and is in course of removal to Twin Lake Mining District for re-erection.

GREEN MOUNTAIN.—It is reported that this company has just leased its properties, located on Ball Mountain, surrounding the Green Mountain mine.

HUMBOLDT.—A great deal of work is doing on the properties of this company, situated on the south side of Carbonate Hill. The Humboldt and Gold Leaf lodes are worked by lessees, and the Thistle is developing by the company.

LITTLE CHIEF.—A drift has been driven from the 186-foot level of the Daly shaft eastward to the eastern line of the Little Chief claim, and then northward on the eastern side-line of the Little Chief for a distance of 250 feet. The face of the drift here is in fine-looking iron. A rise was made from the breast of the north drift, and for fifty feet the rise continued in fine-looking iron, then cut through some medium-grade ore, and finally broke into a stope made by the O. K. lessees, who were found trespassing on the territory of the Little Chief. Investigation showed a stope about twenty-five feet in length, seven to eighteen feet high, and four to ten feet wide. The breast of the stope showed iron, galena, and lead carbonates, carrying considerable silver. The streaks were quite strong, and the entire stope is supposed to have contained rich ore. Several specimens were taken from the walls of the stope and an assay made, returning thirteen hundred and odd ounces in silver to the ton.

LITTLE PITTSBURG.—A drift has been driven east to the Amie line, and is now driving to the north of the line, with fair indications of soon cutting iron. The old workings of the lode proper are worked on tribute by F. B. Grant & Co., who began operations recently. The eastern portion of the old workings of the discovery claim was leased to Hereford & Co about a fortnight ago. Considerable dead-work has been done so far, but pay-work will soon be in order.

Mr. Hawley, formerly with the Grant Smelting Company, and more recently superintendent of the Little Sliver, resigned yesterday, and has accepted the position of metallurgist with the Manville Smelting Company, which will start up the Elgin smelter in about a week.

PARK COUNTY.

FREELAND.—Twenty-eight men have been discharged from the Freeland mine and mill, twenty-four from the former and four from the latter. This reduction is owing to the fact that during the past year development has been carried on to a large extent, and that now the extraction by stoping of the higher-grade ores required a smaller force of men without diminishing the value of the output.

DAKOTA.

Owing to the spring floods, things at Deadwood, and, in fact, throughout the hills generally, are rather dull. The recent cave in the Terra (Deadwood-Terra) did not injure any one. Ten floors went down. The necessary repairs incident to the late flood will be made on the Homestake railroad immediately, when

the Caledonia will be furnished with wood, and operations will be resumed. Work on the lower winze was recommenced recently.

CALEDONIA.—The superintendent reports for the week ended May 20th: On the 18th, all men were discharged with the exception of force enough to pump out the mine. A heavy rain fell on the 17th, and caused water to rush into the mine to the depth of three feet, at which we kept it. The roads and railroads are so washed out that wood can not be brought in here. Think it will be about two weeks before we can resume milling. Shipped 671 ounces gold—about $11,500. May 27th, he reports: We have worked 12 men per day at the mine for the past week pumping water, overhauling machinery, and doing other necessary work. The mine is now clear of water, and we resumed sinking the winze last night. We expect to secure wood by the 29th, and will start the mill immediately.

IDAHO.

VALLEY VIEW.—The Wood River *Times* says that this mine has paid its way from the grass-roots. The developments consist of a tunnel 225 feet in length, five cross-cuts about 20 feet long each, two rises, and an incline-shaft or winze. The cross-cuts are run from the tunnel, two on each side, at distances about 20 feet apart, and all show ore. The width of the vein-matter is very great, probably exceeding 50 feet. The ore is of high grade, carrying an average of 265 ounces of silver and 72 per cent lead. Some 60 tons of second-class ore are on the dump, and there are large reserves in the mine.

MEXICO.

GUANAJUATO.—A new mining company has been organized, known as the International Mexican Mining Development Company, on a basis of $4,000,000, divided into 40,000 shares of $100 each.

MICHIGAN.

INDIANA.—It is claimed that this company has made a sale of 5000 tons of ore at $5 25 on the cars, and can sell its entire product for the season at the same price.

LAKE ANGELINE.—The management has sold the entire season's product, the shipment of which has been commenced. The ore is from the newly opened deposit, and a very fine quality of soft hematite.

QUINCY.—The ledge has been struck, at a depth of 55 feet, where ore of better quality than hitherto found in that vicinity was obtained.

MONTANA.

DEER LODGE COUNTY.

PHILLIPSBURG.—According to a correspondent of the Butte *Daily Miner*, the placer mines of this locality will soon be heard from. The Granite mine is looming up. The header of the lower tunnel now stands in six feet of 80-ounce ore. A large force of men is busily at work opening the new road to Hasmark, to connect the mine with the Algonquin mill. The Hope mill is running steadily. The mine keeps the batteries supplied, besides holding a reserve on hand. The diamond drill, intended to prospect the mines of the Hope Company on Hope and Apache hills, is testing. In the San Francisco, the face of the tunnel shows over three feet of ore, assaying 90 ounces and better. This mine lies in the granite, just over the contact. The owners of the Virginia, Elgin, Stonewall, and Lady Mary mines in the granite are preparing for immediate work.

JEFFERSON COUNTY.

AMAZON.—Contracts have been made for 200,000 bricks for the roasters and smelters and for a large amount of lumber for the buildings. These works will be pushed to completion during the present season.

MADISON COUNTY.

ALTA-MONTANA.—According to the Helena *Independent*, there is a project on foot looking to the removal of these works to Helena. The principal reasons for so doing are, that the iron ore and lime-rock used as flux at present have to be hauled from Helena to the works at great expense, and on finishing the railroad, coal for fuel will be laid down here at rates so low as to greatly reduce the cost of smelting.

The Rochester Mining District is just now attracting considerable attention, and the indications point to renewed activity in that section during the present season. The sale is reported of a fourth interest in each of the three properties known as Magna Charta, Garfield, and True Fissure, for the sum of $10,000, to Eastern parties.

SILVER BOW COUNTY—SUMMIT VALLEY DISTRICT.

ANACONDA.—It is said that this company has invested upward of $1,000,000 in the development of the Anaconda and St. Lawrence mines, in the purchase of machinery, the erection of buildings, and in buying fuel.

The present prosperity of the mining interests of Summit Valley District, says the *Inter-Mountain*, is of an extremely gratifying character, and is beyond all dispute. The mines, mills, and smelters are all in profitable operation and running in full blast. Two hundred and twenty-five stamps are pounding merrily away on pay ore, and the output of our silver mines is limited only by the capacity of the mills to treat their product. The four smelters are daily reducing to a marketable form between 250 and 300 tons of high-grade copper ore, and at least 50 tons of crude copper ore are shipped daily to Baltimore or Swansea. The indications are all favorable for an output this year of a total value of between $9,000,000 and $10,000,000. Fully 2500 men are given constant employment at remunerative wages in the mines, mills, and smelters of the district.

POSER.—The new strike in this mine, the property of the Silver Bow Company, is of even greater importance than was at first supposed. The 100-foot east shaft, which follows the vein from the surface, shows good ore all the way down. At the bottom, a cross-cut showed the pay-streak to be fifteen feet wide. Drifts have been started east and west, and an ore-breast twelve feet wide is extracting, three feet of the pay ore-body being of rather low grade. The remaining 12 feet, however, assay from $50 to $100 per ton.

PROVIDENCE.—This mine, situated near Lincoln Gulch, on the Big Blackfoot, yielded 60 ounces of gold, the result of a few days' run of the ten-stamp mill belonging to the company owning the mine.

NEVADA.

ESMERALDA COUNTY.

MOUNT CORY.—A mill to be provided with three sets of Krom rolls is to be put up, and probably a leaching plant will be built.

SAFFORD DISTRICT.

ONONDAGA.—This mine has been stripped on the surface along the ledge a distance of 800 feet, exposing ore varying in width from eight inches to six feet, and in price from $30 to $450 per ton. A force of 20 men is employed at present, and more are to be put on. A new tunnel has been started about 25 feet below the old workings, which is to be run a distance of 800 feet, there to connect with a shaft which is sinking on ore on the northern end of the claim.

ZANOLL.—This claim shows a considerable amount of work. The ledge was first encountered in the shaft at a depth of 30 feet, and has since continued down a distance of 112 feet, varying in width from three inches to six feet, the latter being the present width of the ledge in the bottom of the shaft. The ledge is perfect and well defined, the foot and hanging-walls being plainly discernible throughout the entire depth of the shaft. The ore averages high. A tunnel had been run a distance of 300 feet without success, finally going to a place above, where, at a depth of 300 feet, the ledge was encountered. If present indications continue, it is the intention of the owners to erect a mill on the Humboldt River at Gerald, about a mile distant, where it is estimated ores averaging $12 per ton can be worked at a profit.

NEW MEXICO.

The Santa Fé *New Mexican* states that in the south and eastern portions of Santa Fé County, in the New Placer District, is a section of New Mexico which will become one of the most productive districts in the territory. Its immense area of rich placer ground, its wealthy gold-bearing quartz veins, its fine mines of copper, and its large deposits of argentiferous lead ores all impress one with the greatness of the future possibilities of the district. Although much has been written about the auriferous gravel deposits of the district, their wealth and extent are such that they will continue bearing favorable reference, until steps are taken to work them on a scale proportionate to their magnitude. Almost every gulch or arroya containing deposits of earth is rich in gold; and notwithstanding the drawback occasioned by the scarcity of water, the time must be near at hand when these deposits shall be effectually and systematically worked. Here, it may not be amiss to give a short sketch of the history of the New Placer mines. The discovery of gold was first made in 1842; and within the next five years, the population of the district increased to nearly 4000 souls. Over 1000 persons were engaged in placer mining in the vicinity in 1847. The amount of gold secured has never been even approximately made public; owing to the dangerous and lawless elements, all information as to the product at the time having being kept very quiet. The mode of working was by sinking shafts and drifting, extracting only the richest pay-streaks. In the winter season, when there was snow on the mountains, the miners utilized the snow, melting it with heated stones. When there was no snow, water was brought from springs and the creek at from one to two dollars per barrel, and thus the work was continued. The washing was done in wooden bowls, and carried on under disadvantages; nevertheless it paid well. Many nuggets of considerable value were found, among them one reported that had a weight of eleven pounds and nine ounces avoirdupois, sold for $6000, being at the rate of $16 an ounce troy. At present, several companies are engaged in drilling for water in this section, and it is to be hoped that they will succeed in securing the necessary flow to permit them working on a large scale. Fair pump-wells have been opened; but the supply necessary for working on a large scale has not been secured, though the operations continue with a very sanguine spirit. The quartz-veins of the district are among the richest in the West. The veins as a rule are very strong, and the dissemination of gold through the vein seems general and generous. In the Tuerto Mountains, especially, some of the finest quartz leads to be found anywhere have been opened and worked to some extent, although doing but little just now.

The hitherto abundant supply of iron boulders in the Gallinas Mountain, says the Santa Fé *New Mexican*, utilized for flux in smelting, is rapidly failing.

CUCHILLO NEGRO MINING AND SMELTING COMPANY.—The furnace of this company at Fair View, in the Black Range, is again idle.

IVANHOE.—Work is to be resumed at this mine.

OLD MAN.—This location, at Silver City, is reported to have been bonded for $500,000, the bond including the privilege of exploring the new discovery. Work is reported in progress, and the property is showing up very well. A report just received states that an important strike of horn-silver has been made.

SAN JOSE.—This smelter has been blown in again.

SIERRA BELLE AND SIERRA APACHE.—These mines are to be prepared for large productions. The mines contain a great deal of 50 to 250-ounce ore, which is to be utilized as soon as possible.

UTAH.

FRISCO DISTRICT.

HORN-SILVER.—The bullion shipments for the week ended May 26th were $39,000; previously reported output of this mine for the present year, $1,309,500; present total, $1,348,500.

SUMMIT COUNTY.

CRESCENT.—Mr. J. J. Daly resigned his position as superintendent of this mine recently, and Mr. Peter Porter was elected by the trustees to succeed him.

SAMPSON.—The vice-president of this company reports that 31 tons of second-class ore from the company's mines were sold at Salt Lake City on May 22d at $32 per ton, and that two cars of first-class ore were to have been shipped from the mine on Monday last. Reports from the mine state that on May 18th the east drift of level No. 2, Van Praag incline, had opened into three feet of solid ore, averaging 55 ounces silver per ton and 32 per cent lead, and that the west drift was in one foot of first-class ore running 100 ounces silver per ton and 42 per cent lead. The new shaft is down 60 feet and is to be connected with the vein at a depth of 200 feet by the first of August next.

SILVER MOUNTAIN.—The Salt Lake *Tribune* is authority for the statement that a big strike has been made in this mine, which is situated on Kessler's Peak, Big Cottonwood. For some time past, a tunnel has been run to cut the vein; and when this was accomplished, the tunnel had penetrated the mountain 400 feet. An ore-body five feet wide, the first-class assaying 55 ounces silver, 58 per cent lead, $3 gold, the second class 23½ ounces silver, 26 per cent lead, was encountered. The tunnel is 400 feet below the upper workings, and all the ore can be extracted through it.

WASHINGTON COUNTY—SILVER REEF.

STORMONT.—The superintendent reports: The chamber now opened at twenty-three winze is about fifteen by thirty feet. From above the chamber, about 100 tons have been extracted, and it is reasonable to suppose that the ore will extend enough farther into the solid ground on all sides of this chamber to furnish another 100 tons. Indeed, I shall be disappointed if it does not produce 1000 tons. We are just blasting the ore down and sending it to the mill, and are not yet drifting in it. The fifteen-winze strike shows no change since weekly report of 26th, as we have been stripping the vein, taking down only waste. Assays yesterday showed $108.41 per ton as the average of thirty inches in thickness of ore.

The superintendent telegraphs that a new strike has been made in winze 15. Two feet of $100 ore. Bullion for May, $20,000.

WYOMING.

ALBANY COUNTY.

The *Laramie Boomerang* says that a valuable deposit of iron ore has been discovered near Rock Creek. The iron ore is found in the same hill or "hog-back" containing the soap. It is reddish-brown in color, but gets almost black after being exposed to the air for a time, and is found in lumps something the shape of a kidney, ranging in size from six inches to four or five feet across. It lies about 1000 yards from the railroad track, opposite the eating-house.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, June 8.

This week has been one of remarkable dullness in the mining market. The dealings have been mostly confined to a few stocks, and the Comstocks were the attraction at strong prices. The fancies were all weak, especially Robinson, Sonora, and Decatur. Sonora, as usual, was very actively dealt in, but gradually declined, and closed to-day at its weakest price. Stormont is looming up as an active stock in the market, and indications point to better prices. Sierra Grande was stronger than of late, but the transactions were small. The total number of mining shares sold at all the Exchanges aggregates 196,662, as against 355,084 last week.

The Comstock shares had a fair business at strong prices. California was strong, selling from 29@38 @36c. Consolidated Virginia was moderately dealt in, and was strong; it sold from 58@72@69c. Sierra Nevada had a small business at strong prices, selling from $6@$6.88. Union Consolidated, with a small business, was also strong, selling from $6.25@$7.25. Consolidated Imperial records a moderate business at steady prices, selling from 11@10c. Best & Belcher was dealt in to the extent of 30 shares at $5.25@ $4.75. Sutro Tunnel had a very active business, at irregular prices; it sold from 23@29@26c.

The Leadville stocks were quiet and steady. Amie was quiet and a little weak, selling from 19@16c. Chrysolite had a small business at steady prices; it sold from $1.15@$1.20. Hibernia sold from 3@4c., with a business of 1100 shares. Iron Silver had a small business and was steady; it sold from $3.10@ $2.85, the latter price is ex dividend. Leadville sold at 50c. under a small business, and Little Chief at 40c. Little Pittsburg was irregular, with small transactions, selling from 78@65c.

The Bodie stocks were also quiet and steady. Bodie Consolidated sold from 90c.@$1 under a small business. Standard was moderately dealt in at strong prices, selling from $6.88@$7. Bulwer sold from 60@55c., with a business of 200 shares. Goodshaw was quiet and steady at 5@4c.

The Tuscarora stocks had a small business, and were weak. Argenta sold at 50c. under one small transaction. Belle Isle sold assessment unpaid, and was irregular under a small business; it sold from 20@15@ 22c. Navajo passed its dividend, and in consequence was weak, with a fair business; it sold from $1.70@ $1.50. Independence was quiet and irregular, selling from 35@30@32c. Elko Consolidated was quiet and steady at 18@19c.

In the miscellaneous list, Alice was quiet and steady at $2.75. Bassick sold at $8, the transactions being small. Caribou Consolidated had a fair business at steady prices, selling from 14@13c. Eureka Consolidated was moderately dealt in at weak prices; it sold from $3.45@$3@$3.05, assessment unpaid. Reports state that the company has started up another furnace, principally on account of the increased ore-shipments from Eureka Tunnel and expected shipments from Albion. The Green Mountain stocks were quiet and steady. Gold Stripe sold at 9c. Green Mountain sold from 70@72c., and Cherokee sold at 3c. Homestake was very quiet at $15¼. Horn-Silver was quiet at irregular prices; it sold from $6.63@$6.25@$6.50. Robinson has been quiet and weak; it declined from 83@75c. under a business of 9400 shares. Sierra Grande was moderately dealt in at strong prices; it sold from $1.50@$1.70@$1.65. Stormont has been actively dealt in at strong prices; it sold from 60@72@70c. The stock of the reorganized company has been listed on the Mining Exchange, and the developments at the mines are reported to be good. Expenses have also been reduced.

Alta-Montana has been weak at 4@3c. Bradshaw has also been weak, selling from 33@25c. under a small business. Caledonia records a sale of 100 shares at 80c. Central Arizona sold at 30c. Decatur has become quite weak under an active business, selling from 7@3c. Durango was quiet and steady at 7@6c. Eastern Oregon had a small business at steady prices, selling from 30@32c. Harlem records a moderate business and was irregular; it sold from $1.55@ $1.40@$1.45. Hortense sold at 9c., and Lacrosse at 12c. Oriental & Miller was quiet and steady at 18@16c. Silver Cliff was moderately dealt in and developed a little strength; it sold from 15@20c. Sonora Consolidated had a very active business at declining prices; it sold from 40@29c. State Line Nos. 1 & 4 developed considerable activity at steady prices, selling from 5@4c.; Nos. 2 & 3 quiet and steady at 7@6c. South Pacific sold on Saturd ay at 6c. Monday the stock was struck off the list of the Mining Board, as no attention had been paid to the request of the Board for a statement from the company, and for an explanation of the fact that the books were not kept open for transfer of the stock.

The Trustees of the Gold Placer Mining Company recently issued a notice to the stockholders of the company, stating that unless they came forward and paid a voluntary assessment of four cents per share before June 12th, the property of the company would be sold to pay a claim of about $8000. A meeting of the stockholders was held yesterday at No. 60 Broadway, at which no definite action was taken in the matter beyond the conclusion to make a strong endeavor to raise the money.

An assessment of twenty-five cents per share has been levied by the Tip Top Silver Mining Company, delinquent July 6th.

The Great Boulder Consolidated Gold and Silver Mining Company, of Colorado, in 1880, mortgaged its mines to secure $100,000 of its bonds. In 1881, no interest was paid on the bonds, and the trustees of the mortgage foreclosed it at the request of George William Ballou and Edwin Ford, who held $74,000 of the $89,000 bonds issued. The property was sold, and the trustees bought it in for $60,000 in the interest of the bondholders. Since the sale, the two parties in interest have been unable to come to an agreement, and Judge Donohue has granted an order directing a resale of the property, after the usual six weeks' notice, at the Exchange Salesrooms in this city.

It is said that the stock of the Barcelona Mining Company will soon be listed at the Mining Board. The mine has been leased on very advantageous terms, and the lessees are reported to be taking out ore which will soon be milled and pay the company good royalty.

MEETINGS.

Bonanza King Consolidated Mining Company, No. 29 Wall street, New York City. Meeting of stockholders, June 16th, at two o'clock P.M., to sanction and approve an agreement to consolidate with the Trojan Consolidated Mining Company.

Central Coal Company of Pennsylvania, office of Messrs. G. B. Newton & Co., No. 329 Walnut street, Philadelphia, Pa. Annual meeting of stockholders and election of directors, July 10th, at twelve o'clock noon.

La Plata Mining and Smelting Company, No. 58 Broadway, Rooms 12 and 13, New York City. Annual meeting of stockholders and election of trustees, June 21st, at one o'clock P.M.

Old Dominion Copper Company, No. 72 Broadway, New York City. Postponed annual meeting of stockholders, June 29th, at twelve o'clock noon.

Trojan Consolidated Mining Company, No. 29 Wall street, New York City. Meeting of stockholders, June 16th, at two o'clock P.M., to sanction and approve an agreement to consolidate with the Bonanza King Consolidated Mining Company.

DIVIDENDS.

The Standard Consolidated Mining Company has declared its monthly dividend of twenty-five cents per share, payable June 12th at the Farmers' Loan and Trust Company.

PIPE LINE CERTIFICATES.

As will be seen by reference to our quotations and sales below, the oil market this week has been very active, and the fluctuations have been of a very wild and varied character. Opening on Saturday morning last at $1.19½, oil fell to $1.18½, then took an upward turn to $1.23⅛, closing at $1.20. On Monday, it was weak, and closed with a demoralized market. Tuesday witnessed a still further decline; but on Wednesday there was a reaction, and the "bulls" had the advantage. Yesterday (Thursday) was a field-day for the "bulls," the market being very strong. To-day, the market again turned and lower prices prevailed. The market throughout has been one of manipulation.

No news of an important character has been received from the oil regions during the week. The report of the Pipe Line Company shows an accumulation of oil in its custody from the first of June to the 5th inclusive, of 29,682 barrels in excess of its deliveries. The recent fire near Alleghany City, Pa., destroyed 32,000 barrels, and an assessment of one barrel per thousand has been levied to pay the insurance. Notice has also been given by the Trust Company that all certificates sent to the Clearing-House must be accompanied by a check for $3 per thousand barrels as a guarantee against fire assessments, the Trust Company to return the balance after such assessments have been deducted.

The following table gives the quotations and sales at the New York Mining Stock and National Petroleum Exchange:

		Opening.	Highest.	Lowest.	Closing.	Sales.
June	2....	$1.19½	$1.23⅛	$1.18½	$1.20	3,553,000
	4....	1.21	1.21⅜	1.14	1.15	4,891,000
	5....	1.14⅞	1.15⅝	1.09⅝	1.11⅜	5,524,000
	6....	1.11¼	1.18⅛	1.10⅝	1.18⅛	4,047,000
	7....	1.19	1.23¼	1.15¼	1.17	3,884,000
	8....	1.16⅝	1.17⅜	1.15	1.15½	2,210,000
Total sales.						24,109,000

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. June 1.	June 2.	June 4.	June 5.	June 6.	June 7.
Albion	.....	.....	.....	.....	.....	.....
Alpha	2½	.....	3	.....	.....	.....
Alta	.80	.65	.80	.75	.75	.75
Bechtel	.....	.....	.....	.....	.....	.....
Belcher	1⅜	1¼	1½	1¾	1½	1½
Belle Isle	.25	.20	.....	.....	.25	.....
Best & Belcher	4½	4	4¾	4½	4	4½
Bodie	1½	1⅛	1	1	1	1⅛
Bullion	.....	.....	.....	.....	.....	.....
California	.35	.35	.35	.35	.30	.30
Chollar	3⅞	3⅝	.....	3⅝	3⅛	3⅜
Con. Virginia	.60	.60	.70	.65	.60	.65
Crown Point	1¾	1⅝	1¾	1¾	1⅜	1½
Elko Cons	.20	.20	.....	.20	.20	.30
Eureka Cons	3⅝	.....	3½	3¼	3⅛	3½
Exchequer	.40	.40	.45	.45	.40	.50
Gould & Curry	3⅜	3½	3⅜	3¼	3¾	3¼
Grand Prize	.50	.50	.50	.45	.50	.50
Hale & Norcross	7½	7⅜	8	7¾	7¼	7⅜
Independence	.35	.....	.35	.35	.35	.35
Martin White	.30	.30	.30	.30	.25	.25
Mexican	4⅛	3¾	4¼	4¼	3⅝	4⅛
Mono	.....	.....	.....	.....	.....	.....
Mount Diablo	.....	.....	3	.....	.....	.....
Navajo	1⅜	1¾	1¾	1¾	1⅝	2¼
Northern Belle	6⅜	6⅛	6¼	6⅞	7¼	7¼
North Belle Isle	.....	.....	.....	.15	.....	.....
Ophir	3¼	2¾	3¼	3¼	2¾	3¼
Overman	.....	.....	.....	.....	.....	.....
Potosi	1⅝	1⅝	1⅝	1½	1¼	1⅜
Savage	2¾	2⅜	2¾	2⅜	2¼	2½
Scorpion	.....	.....	.....	.....	.....	.....
Sierra Nevada	5¾	5½	6⅛	6⅝	5⅞	7
Silver King	.....	10¾	.....	10⅞	10⅞	.....
Tip-Top	.....	.....	.....	.....	.....	.....
Union Cons	6	6⅜	7⅛	7⅛	6⅞	7⅜
Wales Cons	.....	.....	.....	.....	.....	.....
Yellow Jacket	4⅛	4	4½	4¾	4⅛	4⅜

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

BOSTON, June 7.

The market for copper and silver stocks continues to rule dull and inactive. There is so little doing that it is difficult to obtain reliable quotations on the greater portion of the list of stocks dealt in at the Exchange. In copper stocks, Calumet & Hecla, as usual, takes the lead, and in face of the decline of ingot copper to 15½c., shows an advance of $31¼ per share over last week, with sales at $237½. Franklin sold at $10 in small lots, with same bid for it. The May product was 170 tons, and the reports from the mine are all of a favorable character. Quincy is firm at last week's quotation, with sales at $44. A small lot sold to-day at $45, which was also bid for it at the close. The stock is said to be largely oversold and scarce for delivery. The product for May was 261 tons, against 201 tons last year in May. Osceola was quite firm early in the week at $21½, but later sales were made at $20½, closing $20 bid. This stock has been rather more freely offered than usual, and the desire to sell it is the cause of the decline. There were no sales of Pewabic for the week; it is held at $4, with $3 as the best bid. A letter from the Pewabic mine says: The lode in the

shaft continues to show a little copper, but not of much value. The lode in the 31st level, both north and south, is improving. It seems as if we should have some ground at these points that will pay to stope. There is no change to notice in any other part of the mine. The May product was 70¼ tons. In other copper stocks there is nothing doing. A letter from the agent of the Huron copper mine says: There is but little change to notice in the mine since my last report, except in No. 10 shaft, where the lode is quite rich in stamp and barrel copper. Work at the mill seems to be gaining a little faster for the past few days than for some time before. On the whole, Huron never looked so well as it does to-day. Huron stock is quiet at $1½ asked. The reports from the Douglas Copper Company, of Maine, are encouraging. The company has produced sufficient ingot for a month to pay expenses, and hopes soon to be on an undoubted self-sustaining basis. One ton of ingot copper per day is about the present product of the mill. The management is commendably conservative in what it says of the future and will not encourage the hope of dividends for a couple of years. Meanwhile, it hopes to accumulate a good working surplus. There is but little of the stock offered in the market, $1 being bid for it without calling any of it out.

With the exception of Sullivan, the market for silver stocks is dull and lifeless. Sullivan opened strong, and in the early dealings sold quite freely at $2⅛@$2¼, but later it declined to $1¾, rallied to $2, and finally settled down to $1⅞, which was the closing sale and bidding price. About 2000 shares changed hands. Bonanza sold at $2¼, and Harshaw at 50c. Nothing doing in Catalpa or Crescent.

At the Boston Mining Exchange, trading is confined to a few specialties, and prices are generally unchanged.

3 P.M.—There was was no change in the market this afternoon, which was dull as ever. Harshaw sold at 50c. and Quincy advanced to $46. Bonanza, $2¼ bid, $2⅛ asked. Catalpa, $50@$55. Crescent, 25@30c. Sullivan, $1⅞@$2. San Pedro, 35@40c. Calumet & Hecla, $287 bid. Franklin, $10@$10½. Osceola, $20@$20½. Pewabic, $3@$3¾. Quincy, $45½ bid.

BULLION MARKET.

NEW YORK, Friday Evening, June 8.

The London market comes weak, and the tendency would seem to be toward somewhat lower figures.

DATE.	London	N. Y	DATE.	London	N. Y.
	Pence.	Cents.		Pence.	Cents.
June 2.	50⅛	109¾	June 6.	50⅛	109¾
4.	50⅛	109¾	7.	50⅛	109¾
5.	50⅛	109¾	8.	50 1-16	109⅝

Bullion Receipts at New York.—The bullion received from the mines at the various offices in this city during the week ended June 8th, as compiled from various sources, amounted to $174,000, as against $117,000 reported for the previous week. The receipts from January 1st, 1883, to date are $5,409,713.53.

Exports and Imports of Gold and Silver at New York.

Exports.

Week ended June 2d	$154,000
Corresponding week last year	502,700
Since January 1st, 1883	5,845,911
Corresponding period last year	29,157,548

Imports.

Week ended June 2d	$24,006
Corresponding week last year	18,426
Since January 1st, 1883	6,712,939
Corresponding period last year	1,732,653

Foreign Bank Statements.—The governors of the Bank of England, at their weekly meeting, made no change in the bank's minimum rate for discount, and it remains at 4 per cent. During the week, the bank gained £329,000 bullion, but the proportion of reserve to its liabilities was raised only from 35¼ to 35¾ per cent, against 43¼ per cent at this date a year ago. To-day, the bank made a further gain on balance of £33,000 bullion. The weekly statement of the Bank of France shows an increase of 1,200,000 francs gold, and a loss of 825,000 francs silver.

BULLION PRODUCTION FOR 1883.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported. The table gives the amount shipped for the week up to the date given, as well as the aggregate shipments to such date from the first of January, 1883.

The shipments of silver bullion are valued at $1.29·29 per ounce troy; gold at the standard $20.67 per ounce troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver. If the price of silver be counted at $1.11 an ounce, which has for some months been about its average value, the following figures, where they relate to silver bullion, should be diminished by about 14⅛ per cent, to arrive at actual value.

MINES.	States.	Month of April.	Year from Jan. 1st, 1883.
*Alice, G. S.	Mont	$86,226	$320,419
*Alta-Montana, G. L. S.	"	.....	$10,625
*Belmont	"	5,171	17,775
Bodie, G. S.	Cal	25,085	91,342
Bodie Tunnel, G.	"	10,470	45,319
*Bonanza King, G.	"	57,000	199,077
*Boston & Montana, G.	Mont	18,741	72,318
*Central Arizona, S.	Ariz	.....	35,845
*Christy, S.	Utah	24,249	92,654
*Chrysolite, S. L.	Colo	24,146	142,238
*Contention, S.	Ariz	83,754	293,014
Crescent, G.	Cal	.....	13,000
*Custer, G. S.	Idaho	.....	43,572
*Deadwood-Terra, G.	Dak	.....	120,231
*Derbec Blue Gravel, G. S.	Cal	10,041	31,844
*Father de Smet, G.	Dak	26,596	127,985
*Frisco M. and S. Co., G. S. L.	Utah	16,366	§77,084
*Head Center Cons.	Ariz	6,865	6,865
*Head Center and Tranquillity	Ariz.	13,893	18,486
*Hecla Cons., G. S.	Mont	§57,060	234,984
*Homestake, G.	Dak.	.....	330,060
*Hope, S.	Mont	.....	20,574
Horn-Silver, S. L.	Utah	291,000	1,055,000
*Independence, G. S.	Nev	7,779	34,722
*Kentuck, G. S.	"	2,100	8,237
*Lexington, S.	Mont	96,317	421,204
*Little Pittsburg, S. L.	Colo	3,296	22,873
*Marguerite, G.	Cal	.....	33,200
*Martin White, G. S.	Nev	.....	136,317
*Moulton, G. S.	Mont	.....	123,288
Mount Diablo	Nev	65,221	75,078
*Navajo, G. S.	"	69,646	281,626
*North Belle Isle	"	1,953	1,953
Northern Belle, S.	"	75,700	343,015
*Ontario, S. L.	Utah	222,274	807,695
*Oxford, G.	N. S.	6,181	21,324
*Phœnix, G.	S. C.	.....	43,666
*Pinal Cons., S. L.	Ariz	37,388	137,860
*Satemo, G.	N. S.	.....	2,500
*Silver Bow, G. S.	Mont	29 433	101,241
Standard, G.	Cal	108,477	371,483
Star, S.	Nev	.....	27,095
*Stormont, S.	Utah	19,677	74,281
Syndicate, G.	Cal	4,869	14,086
Tintic M. and M. Co.	Utah	.....	7,632
*Tip Top, S.	Ariz	.....	‡22,983
*Tombstone, G. S.	"	53,071	‡246,230
Yellow Jacket, S.	Nev	54,120	152,873
Total amount of shipments to date			$6,963,072

* Official. † Net value. ‡ Assay value. § Not including value of lead. *G. Gold. S. Silver. L. Lead.*

METALS.

NEW YORK, Friday Evening, June 8.

Copper.—The event of the week has been the sale by the principal lake producers of from 18,000,000 to 20,000,000 pounds at private terms. As to the details of the transaction, nothing but vague rumors are as yet current. A large portion of it—some say all—has been taken by manufacturers, the delivery to extend over the next five months. It is stated in other quarters that some of it was for export. The price is given as 15c., while some of it brought 15½c.

For jobbing lots, it is not possible just now to do better than 15⅞c., but of course there is little buying, and for a long time to come there will be little movement in lake copper. Meanwhile, we must record also export sales of upward of 3,000,000 pounds of Arizona copper, details not having been made public as yet. The market has not settled down sufficiently after these transactions to permit of any statement of its condition. We quote nominally Lake 15⅝@15¾c., and other brands 14@15¼c.

Should it prove correct that the Lake companies have supplied the principal consumers with the bulk of their requirements for some months to come, there can be no doubt that values of other brands must recede a little more. There is reason to believe that a certain, though perhaps small, quantity of lake copper, produced by the smaller mines, will find its way into the markets and will compete with the other brands, of which a large proportion will have to seek a foreign market, unless our home demand picks up. Producers will therefore watch the foreign markets more closely than ever, and thus far the outlook is encouraging. Considerable eagerness has been shown by foreign buyers to take Arizona and other metal produced in the West, and values have thus far been fairly well maintained. England cables £69 10s. f. o. b. for Best Selected, and £64 10s. f. o. b. for Chili Bars.

Tin.—Business has been dull during the week, the market closing nominally 21⅝c. for Straits, 21⅝c. for Australian, 21⅞@22c. for Lamb & Flag, and 22c. for Banca. England cables lower, £94 10s.

Lead.—The market has been dull and lifeless, but has been well maintained. Transactions are on a moderate scale, the closing quotations being 4·45c. for Common and Refined.

Messrs. John Wahl & Co., of St. Louis, wire us as follows to-day:

Our market is firm. Sales will not aggregate 200 tons of Refined, at 4·13c., and 160 tons of Chemical at 4·12½c.

Messrs. Everett & Post send us the following dispatch to-day:

We have no change to report. Our market is quiet and steady at 4·15@4·17½c. Two hundred and fifty tons of a special brand sold at 4·20c.

Spelter.—The market has weakened, and we hear of sales, in a small way, at 4·45@4·50c. for good domestic brands.

Antimony.—A large transaction has been recorded during the week at private terms. We quote Cookson's 10¾c., and Hallett's 9¾c. for jobbing lots.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, June 8.

At the Metal Exchange, there were two tickets in the field, one headed by Theodore Sturgis for President, called the "Wall street ticket," it being favored by and favorable to the members of the old "Wall Street Exchange;" and the other headed by T. Delafield for President, and supported generally by the members of the old Pearl Street Exchange. The latter proved successful. Mr. Delafield was elected President by a vote of 113, to 59 for Mr. Sturgis; Frank Dickerson Vice-President by a vote of 172, to 52 for George V. Tompkins; and Mr. Carl Mayer Treasurer by a vote of 154, to 70 scattering. The contest for Secretary excited the most interest. Mr. Edward J. Shriver was elected, receiving 182 votes, to 42 for Mr. William Allen Smith. The following is the rest of the ticket elected: *For Managers*—John C. Cook, Joshua Hendricks, Theodore Sturgis, John T. De Blois, Elliot F. Driggs, William P. Tilton, B. F. Judson, John J. Williams, E. P. White, A. W. Humphreys, H. B. Moore, A. G. A. Harnickell, D. Houston, E. S. Wheeler. *For Arbitration Committee*—D. Thompson, C. E. Maxwell, E. A. Caswell, Daniel F. Cooney, Austin G. Gorham.

American Pig.—Early in the week, the Thomas Iron Company followed openly the example of other companies who had been quietly, as we reported in our last issue, selling No. 1 Foundry here at $20, and during the week that company has closed contracts for season's delivery with the regular customers for upward of 9000 tons of Nos. 1 and 2 at $20 and $19 respectively. No. 1 is fairly steady at that price, but No. 2 is weaker. We quote Foundry No. 1 at $20@$21 for good to choice brands; No. 2, $18@19; and Gray Forge, $17.50@19. Bessemer pig is quiet. England quotes, per cable, 50@51s. Spiegeleisen is moving off with a fair demand, particularly so far as the higher grade is concerned, fetching $31@$31.50. Foreign spiegel is only in limited supply, while low grade, 10 to 12 per cent metal, finds few buyers.

Scotch Pig.—Very little is doing, as the market for American pig is not such as to warrant heavy or even light purchases of Scotch pig. Quotations are almost entirely nominal as follows, ex ship: Coltness, $24@$24.50; Glengarnock, $22@$22.50; Langloan, $23.75@$24; and Eglinton, $21. Warrants are cabled to-day to the Exchange, 47s. On June 6th, the Glasgow quotations received at the Exchange were: Coltness, 61s. 6d.; Langloan, 61s.; Summerlee, 59s. 6d; Gartsherrie, 57s. 6d.;

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	June 2.		June 4.		June 5.		June 6.		June 7.		June 8.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.			2.75				2.75						200
Amie Con., Co.	.18		.19	.18	.18	.17			.16				4,800
Argenta, Ne.			.50										100
Bar. & Walker, Ut.													
Bassick, Co.	8.00						8.00						250
Belle Isle, Ne.			.20		.15		.15		.22				325
Bodie Cons., Ca.			.95						.95	.90	1.00		1,500
Breece, Co.													
Bulwer, Ca.	.60	.55											200
California, Ne.	.30	.29	.32	.29	.38		.29		.29		.36	.31	2,425
Cal. & Hecla, Mich.													
Carbonate Hill													
Caribou Con., Co.	.13				.14	.13	.14				.13		3,200
Chrysolite, Co.	1.15				1.15		1.20						1,500
Cons. Va., Ne.	.60	.58	.65	.60	.72	.70	.68	.63	.70		.69		3,425
Crown Point													
Deadwood-Terra, Dk.													
Dunkin, Co.													
Eureka Cons., Ne.	3.45	3.35	3.00						3.25		3 05		510
Excelsior, Ca.													
Father de Smet, Dk.													
Findley, Ga.	.10	.08							.09		.08		2,400
Gold Stripe, Ca.					.09								400
Gould & Curry, Ne.													
Grand Prize, Ne.													
Great Eastern, Dk.													
Green Mountain, Ca.					.71	.70			.70		.72		1,000
Hale & Norcross, Ne.													
Hall-Anderson, N. S.													
Hibernia, Co.					.03		.04						1,100
Homestake, Dk.							15.50						100
Horn-Silver, Ut.	6 63	6.38							6 25		6.50		180
Hukill, Co.													
Independence, Ne.			.35	.30	.32								600
Iron Silver, Co.	3.10		2.90		2.90		2.90	2.85					1,100
La Plata, Co.													
Leadville C., Co.	.50												1,000
Little Chief, Co.			.4										17
Little Pittsburg, Co.			.78	.65									605
Marsin White, Ne.													
Moose, Co.													
Navajo, Ne.	1.70		1.60	1.50	1.55		1.50		1.55	1.50	1.55	1.50	2,300
Northern Belle, Ne.			6.50		6.38								165
North Belle Isle, Ne.													
Ontario, Ut.													
Opnir, Ne.													
Plumas, Ca.													
Prussian, Colo.													
Quicksilver Pref., Ca.													
" Com., Ca.					8.00								100
Rising Sun, Ca.													
Robinson Cons., Co.					.83	.80	.81	.77	.77	.76	.76	.75	9,400
Savage, Ne.													
Sierra Nevada, N. M.	1.50		1.55	1.50	1.70	1.60	1.65						3,300
Sierra Nevada, Ne.	6.25	6.00			6.25	6.00					6.88		630
Silver King, Ar.			11.00								11.00		30
Spring Valley, Ca.													
Standard, Ca.			7.00	6.88	7.00	6.88							820
Stormont, Ut.							.70	.60	.72	.68	.70		7,3 0
Tip Top, Ar.													
Tombstone, Ar.													
Vizina, Ar.													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	June 2.		June 4.		June 5.		June 6.		June 7.		June 8.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Advance.													
Albion													
Alta													
Alta-Montana, G.	.04		.04								.03		3,000
Am. Flag, S.													
Barcelona, G.													
Bear Creek													
Bechtel Con., G.													
Belvidere													
Best & Belcher, G. S.	5.25						4.75						30
Big Pittsburg, S. L.													
Bondholder													
Bradshaw, S.											.33		700
Buckeye													
" pref.													
Bull-Domingo, S.L.													
Bye and Bye													
Calaveras, G													
C'lav'r's W.&M.Co.													
Cal., B. H., G.											.80		100
Central Ariz'na, S.							.30						100
Cherokee, G.											.03		2 0
Climax, Co.													
Cons. Imp'ri'l, G.S.			.10		.11							.10	3,200
Crowell, G.													
Dahlonega, G.	.03												100
Decatur	.07		.06		.05		.06				.04	.03	23,300
Dunderberg													
Durango, G.	.07				.06								1,000
Eastern Oregon							.30				.31	.30	1,100
Elko Cons.	.18		.18		.18						.19		8,300
Enterprise													
Fannie Barret													
Globe Copper													
Gold Placer, G													
Goodshaw, G.	.05		.04										600
Granville, G.													
Harlem M.& M.Co.	1.45		1.55	1.40	1.50		1.50	1.45			1.45		2,100
Hortense, S.							.09						10
Lacrosse, G.											.12		1,000
Lucerne													
Mariposa Pref., G													
" Com., G													
Mexican, G. S.													
Miner Boy													
Mono													
North Standard, G.													
N. Horn-Silv'r, S.L.													
Ori'nt'l & Miller, S.							.18				.18	.16	1,300
Quartz Creek													
Rappahannock, G.	.08											.06	1,400
Red Elephant, S.	.07	.05											1,500
Ruby, of Arizona													
Silver Cliff, S.					.17		.15		.19	.18	.20		1,400
Sonora Con.	.40		.40	.39	.40	.39	.38	.37	.38	.35	.34	.29	27,900
South Bodie, G.													
South Bulwer, G.													
South Hite			.11								.10		200
South Pacific	.06												200
State Line, 1 & 4, S.	.05	.04	.05		.05		.05		.05	.04			14,800
" Nos. 2 & 3, S.			.07	.06									1,300
Sutro Tunnel	.25	.23	.29	.25	.28	.27	.28	.26	.27	.25	.27	.25	50,450
Taylor-Plumas													
Unadilla, S.											7.25		
Union Cons, G. S.	6.63		6.25										300

Full tables giving the total amount of dividends, capital, etc., will be printed the first week of each month. Dividend shares sold, 50,982. Non-dividend shares sold, 145,680.

BOSTON MINING STOCKS.

	June 1.		June 2.		June 4.		June 5.		June 6.		June 7.		Sales
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez													
Amie													
Atlantic													
Aztec													
Bodie Con.													
Bonanza D	2.38	2.25			2.15		2.25		2.25				460
Bowman Sil	.17	.16	.17		.19	.18	.18	.17	.18	.17			18,844
Bruns. Ant.													
Bulwer													
California													
Cal. & Hec.					235		236	235	237		237½		25
Catalpa	.55				.56		.56	.55	.56				1,200
Central Ariz													
Cherryfield													
Co. Virginia			.93										300
Copper F'lls													
Copperop													
Crescent							.27½	.25	.25				600
"Cusi"													
Decatur							.06						500
Deer Isle													
Denver City													
Douglas	.90				1.00								70
Duncan													
Dunkin													
Empire							.18						500
Eureka Con.													
Franklin			10.25				10.00		10.25				85
Hancock G.													
Harshaw			.50				.50				.50		575
Huron													
Independ'ce													
Indian Q'n.													
Mammoth	.05												2,300
Mass.& N.M.	.07		.06		.07	.06	.07		.06				9,900
Milton													
Napa													
National							1 25						100
North. Belle							6.50		6.50				20
Ontario													
Osceola			21.50		21.50		21.00	20.50	21.00	20.50	20.50		227
Penn-Breck													
Pewable													
Pine Tree													
Plymouth													
Quincy					44.00						46.00	45.00	118
Ridge													
Robinson													
San Pedro			.40										100
S'ra Nevada													
S'ra Grande													
Silver Islet													
Silver King													
Simpson Gd													
So. Pacific					.07								300
Standard													
Sullivan	2.25	2.13	2.13		2.13	2.00			2.00	1.75	1.88		2,725
Sutro Tun.	.30				.26		.28	.27	.28				1,500
Sycamore													
Twin Lead.	.14												2,300
Vizina													

PHILADELPHIA MINING STOCKS.

	June 1.		June 2.		June 4.		June 5.		June 6.		June 7.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L	
Amer. Cons.											.01		
Argent			.15		.16		.16	.15	.15		.16		5,650
Battle Mt.							.03						2,500
Black Sul.							.02						10,000
Buena													
California													
Calista													
Chrysolite													
Cincinnati	.12	.11	.11		.12	11					.12	.11	.12	10,6o9
Comprom'e.	.21				.20								.21	6,400
Contention			2.00		2.00									80
Con. Virg.	.75		.72½											1,000
Dauntless	.01													1,700
Del Monte														
Denver City											.12			100
Eureka	3.50													100
Girard			.02	.08	.08		.07				.07		.07	.06 8,500
Golconda														
Governor	.08										.08		.08	9,000
Grand Uni'n							.19							2,000
Gunnison	.77½	.70	.77½		.77½		.72½	.70	.60	.50	.52½	.50		13,650
Homestake														
Horn Silver														
Iowa Gulch	.07		.07		.07		.07		.07		.07		.08	.07 62,950
Iron Silver			3.05											150
King Bul'on														
Ledger Con														
Little Dia'd.	.08				.08									2,700
Little Maud														
Little Pitts														
L'g & D'y H														
Montana	.07		.07		.08	.07								5,600
Mt. Sheridan					.04		.04				.04			7,000
Navajo														
North'n B'l.														
Orion														
Orion Pref.														
Palmetto E.														
Pembina							.1							2,600
Penn-Breck.	.09		.11	.10	.11						.10	.09	.11	12,600
Permanent														
Pizarro														
Pizarro Ex.														
Potosi														
Rara Avis					.40	.37½	.32½	.30	.30	.27½				5,700
Rara Avis E.	.12				.12				.12	.11	.11			7,100
Record														
Rico Pion'r.														
Sierra Apac.							.37½	.30	.40	.35	.42½			13,500
Sierra Be. la.							.60		.80	.75	.80			4,500
Sierra G'nde	1.42½	1 22½	1.52½	1 45	1.52½	1.45	1.70	1.55	1.65		1.60	1.50		29,950
Sierra Nev.	6.35		6.25											250
Silver Cord.							1.85		1.85		1.80			1.900
Silver King.														
Silv'r Plume				.01			.02							10,000
Sonora Con.														
Standard														
Sultana	.04				.04		.04		.04		.04			9,000
Sutro Tun'l.	.30		.30				.27½						.27½	1,700
Tombstone					.77½		.77½						.80	4,700
Victor	.02				.02									3,000
Yale Mt.							.03							1,000

Glengarnock, 54s.; and Eglinton 48s. Freights are 7s. 6d.

Rails.—The mills are well supplied with orders, though it is generally understood that the business was secured by making concessions. Now, however, $38 at mill is the ruling quotation. England cables £4 15s.

Old Rails.—There is nothing of interest to report. Business is dull and quotations remain nominally $22.50@$23 for Ts.

Scrap.—Dealers are generally so well supplied that they are entirely indifferent. Most of them are unable to market their stock at any thing like remunerative figures, and Scrap is therefore neglected at $23.50@$24 for No. 1.

Pittsburg. June 7.

The settlement of the labor difficulties in this city has strengthened the chances of the blast-furnace interests for selling the current output at firm prices. Gray Forge is moving slowly at from $17@$18; Foundry, $19@$21; Bessemer, $21@$22. The commission men report improving inquiry from manufacturers, who, in anticipation of a strike, permitted stocks to run down, and are now virtually without material. There is no assurance given, or possible to be given, that the mills will continue in operation all summer. The threats of a suspension developed an encouraging activity for the past three or four weeks, in all branches of the finished iron trade, and consumers being now fairly supplied for at least thirty days, are not expected to purchase with any activity for that time. The fact that the producing capacity is in excess of probable requirements points to overproduction, to a declining tendency, and then to a restriction. The iron trade regrets the lack of harmony in counsels, but places the responsibility on those who sought to profit by the suspension of iron making.

Small sales are made at 2@2·10c. for Refined iron. Nails continue active. Muck Bars are under good inquiry at $34.50. Wrought Pipes are 70 and 10 per cent off. Boiler tubes, 55 and 5. Oil Well Casing, 45@50c. per foot. Tubing, 15@16c.; fair activity. T rails will sell at $22@$22.50. Sales of between three and four thousand tons have just been closed at these figures. Buyers of steel rails are placing orders with more confidence for summer and early fall delivery. Prices are firm enough to keep large buyers back, as desired concessions can not be obtained.

Steel rail requirements are expected to develop during the summer, and rail makers look for firmness and an improving demand throughout the year. In merchant steel there is a lull, but mills continue in full operation.

Cleveland. June 6.

Trade for past week has been fairly good and a decidedly better feeling shown since the 1st instant. There is a more settled and confident feeling in the trade, and a large amount of mill iron has been sold within the past two or three days, as mills, in anticipation of the strike, had run stock completely down. Foundries generally have a good amount of work, and now that they know about what to figure on, are buying ordinary size lots, instead of pursuing the hand-to-mouth policy that has for some time ruled. While we can not note any advance in price, yet there is a firmer feeling and current prices are readily obtainable. We quote:

No. 1 Bessemer	$22.00@$23 00
" 1 Foundry, all ore	21.00@ 22.00
" 1 Foundry, cinder mixture	20.00@ 21.00
" 1 Soft Foundry	20.00@ 21.50
" 1 Open Silvery	19.50@ 20.00
Mill irons	18.00@ 19.00
4 months f. o. b. cars furnaces.	
Nos. 1 and 2 Charcoal	$24.00@$26.00
" 3, 4, 5, and 6 Charcoal	25.00@ 26.50
Hanging Rock Charcoal	23.00@ 25.00
Strictly Cold-Blast Charcoal	25.50@ 30.00
4 months f. o. b. cars Cleveland.	
Bessemer ores	$7.00@ $8.00
Hematite ores	5.00@ 6.00

COAL TRADE REVIEW.

NEW YORK, Friday Evening, June 8.

Anthracite.

The anthracite coal trade has relapsed into a state of the most absolute dullness. A few inquiries are made by dealers who want to buy coal for June and July delivery at present prices, with a view to guarding against the threatened increase in July. Thus far, these offers are declined. The companies insist that they mean to put up prices in July, and will be ready to restrict sufficiently to force the market to take the coal at the advanced figures. Until now, however, it can not be said that the announcement of this programme is frightening buyers much. On the other hand, the companies are not showing signs of weakness, but there is considerable other coal pressing upon the market. Manufacturers are cutting down their requirements to narrow limits, and the general depression in business, which will not probably be relieved to any extent during the present month, is telling on the consumption of anthracite coal, notably in the Eastern States. A spirit of extreme caution prevails in all business circles, and the movements of some of the anthracite carrying companies are not regarded with much favor in financial circles.

The following is an abstract of the minutes of the meeting of the Western Anthracite Joint Committee, held in this city last week:

As questions were continually arising, during the intervals between the meetings, that required prompt action, it was thought expedient to appoint a committee to whom such questions could be referred. The following resolutions were accordingly adopted:

Resolved, That an Executive Committee of five be appointed (one representative of each of the five competitive interests), whose functions and duties shall be to act in the interim between the meetings of the Coal Committee upon all matters that may be submitted to them, and they shall report their action to the next succeeding meeting of the Joint Committee for approval.

Resolved, That the secretary of this committee be appointed Secretary of the Executive Committee, and that he communicate to the members of this committee any action taken by the Executive Committee; and further, that the Executive Committee be authorized to invite any members of this committee to attend their meetings.

Pursuant to the above, the following persons were appointed such committee: Messrs. Holden, Frisbie, Sayre, T. M. Richards, and Stickney.

After a general discussion as to the condition of the trade, etc., the following resolutions were adopted:

Resolved, That the prices, as fixed for coal on cars at Chicago, apply to all coal going out of Chicago *by rail*, and that the same price shall apply to all coal on cars shipped from Racine or Milwaukee.

Resolved, That the circular prices of coal, as established by this committee, shall be held to apply only to sales to dealers regularly established in the business, and to manufacturers for their own consumption, and that sales to all other parties shall be at *fifty* cents per gross ton above the circular prices.

Resolved, That sales of coal for municipal purposes, either directly or indirectly, through the medium of local dealers or otherwise, shall be upon the same footing in all respects as any other business, and that no deviations from the prices and terms of sale as fixed by this committee shall be made in consideration of such municipal sales.

Resolved, That *ten* (10) cents per ton be added to the regular car prices, for coal screened into wagons for local delivery in Buffalo.

Resolved, That the fixing of prices on lump coal be referred to the Executive Committee.

Resolved, That the fixing of prices to points not yet arranged be referred to the Executive Committee, who shall promptly transmit the figures to all parties in interest.

Adjourned to meet at the Gilsey House, in New York, on Wednesday, June 27th, at ten o'clock A.M.

JOSEPH J. ALBRIGHT, Chairman.
W. E. STREET, Secretary.

Bituminous.

Absolute stagnation characterizes the bituminous coal trade. The manufacturing demand and the quantities supplied to steamers have fallen off very much, and we hear of little or no business. We quote, alongside, nominally, for Clearfield, $4@$4.25; and for Cumberland, $4.20@$4.40, according to quality.

Horsford's Acid Phosphate
Drank With Soda Water
is delicious. All druggists have it. It is refreshing and cooling. Try it often!

For Sale.
150 volumes in German on mining engineering, all new and handsomely bound. Will be sold at less than cost in Germany. Send for Catalogue.
P.O. Box 232, Westchester, Pa.

ROSE POLYTECHNIC INSTITUTE, TERRE Haute, Ind.—A School of Engineering. Mechanics, Civil Engineering, Chemistry, and Drawing. Manufacturing machine-shops, laboratories, library, cabinet, and models. Address, till September 1st, S. S. EARLY, Esq., Sec'y. After that date, CHARLES O. THOMPSON, Pres.

HOLBROOK, F. N.,
Mining Engineer,
SUPERINTENDENT MINING DEPARTMENT OF THE CORRALITOS COMPANY, CORRALITOS, STATE OF CHIHUAHUA, MEXICO

TIP TOP SILVER MINING COMPANY.
Location of principal place of business, San Francisco, Cal.
Location of works, Yavapai County, Arizona Territory.

NOTICE IS HEREBY GIVEN, that at a meeting of the Board of Directors, held on the 29th day of May, 1883, an assessment (No. 6) of twenty-five (25) cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, Room 44, Nevada Block, No. 309 Montgomery street, San Francisco, California, on all certificates of stock issued at San Francisco, and at the Farmers' Loan and Trust Company, No. 26 Exchange Place, New York City, on all certificates issued at New York.
Any stock upon which this assessment shall remain unpaid on
FRIDAY, THE SIXTH (6th) DAY OF JULY, 1883,
will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, THE SIXTH (6th) DAY OF AUGUST, 1883 to pay the delinquent assessment, together with cost of, advertising and expenses of sale.
By order of the Board of Directors.
HENRY DEAS, Secretary.
Office: Room 44, Nevada Block, No. 309 Montgomery Street, San Francisco, California.

MAPS.

ARIZONA AND NEW MEXICO.—This Map shows all the Township Surveys, Private Land Claims, Post-Offices, and Settlements. It also exhibits the Explorations of other Government and Private Expeditions, including the facts developed by the Surveys for the Routes of Projected Railroads, etc. 1881. Scale, one inch to thirty three miles. Colored, 24×17 inches. Pocket form, $1.

COLORADO.—Topographical and Township Map of the State. Compiled from U. S. Government Surveys and other authentic sources, by Louis Nell, Civil Engineer. By means of symbols, the following mass of facts is graphically shown: Railroads in operation; Railroads chartered or in progress; Wagon-roads; Wagon-roads proposed; Trails; Drainage dry during the greater part of the season; County-seats; Post-offices; Villages; Townships subdivided; Townships surveyed in outlines; Contour-lines, with vertical intervals of 1000 feet; Altitudes in feet above sea-level, by barometer observations and by spirit-levels; Private grants; Military reservations; Indian reservations ceded to the U. S. Government; Arable land, with irrigation. Tables of Areas of Counties; Astronomical Positions; Arable Land. Scale, 1 inch: 10·5 miles, Size, 31 × 40 inches. Pocket form. $1.50, on thick paper.

THE SAME, AS A WALL-MAP, GREATLY ENLARGED. 1881. Scale, 1 inch: 6 miles. Size, 46×64 inches. Backed on linen, mounted on rollers, and varnished. Price, $6

COLORADO.—Topographical and Township Map of Part of the State, exhibiting the San Juan, Gunnison, and California Mining Regions. By Louis Nell. Substantially same as above. Post-offices, March 1st, 1880. Scale, 1 inch: 9 miles. 1-570,240. Plain sheets for wall, 90 cents.

COLORADO.—Cannon's Map of the Mineral Belt of Colorado. Taken from the Records of the Surveyor-General's Office, and other reliable Official Sources Showing, in colors, the Mineral Belt, Gold Districts, Silver Districts, Coal Districts, County Lines, and Boundaries of Land Districts. There are also given the Capital, County Seats, Township Lines, Railroads, and Projected Railroads. Scale, 1 inch: 10 miles. Size, 26x30 inches. Pocket form, $1.50; as a wall-map, $2.

SAN JUAN MINING REGION (COLO.).—Kibbe's Geographical and Geological Map of the San Juan Mining Region. 1881. Shows county lines, wagon-roads, stage routes, trials, railroads, cities and towns with post-offices, camps with post offices, reduction-works, mountain peaks, continental divide. Also (by colors), eruptive rocks, Carboniferous, Cretaceous, Jura Trias. Elevations above sea-level. Scale, one inch to the mile. 2 ½×27 inches. Includes, on same sheet, a reduced Map of the tate of Colorado. Printed in colors, with board covers. $1.50.

SAN JUAN MINING REGION (COLO.).—Stockder's Map of San Juan Mining Region, compiled from U. S. Surveys and other Authentic Sources. 1881. Shows county boundaries, district boundaries wagon-roads, trails over mountain passes from river basin to river basin, continental divide, timber-line (11,000 to 11,500 feet above sea-level), etc. Scale, 1 inch to the mile, or 1=63360. 28×38 inches. Pocket form, stiff paper cover, $1.50; or as wall-map, $1.50.

Address
The Scientific Publishing Co.,
P.O. Box 1833. 27 Park Place, New York.